1378

Scientific Review

AND

SCIENTIFIC AND LITERARY REVIEW,

A RECORD OF PROGRESS IN ARTS, INDUSTRY, AND MANUFACTURES,

INCORPORATING THE

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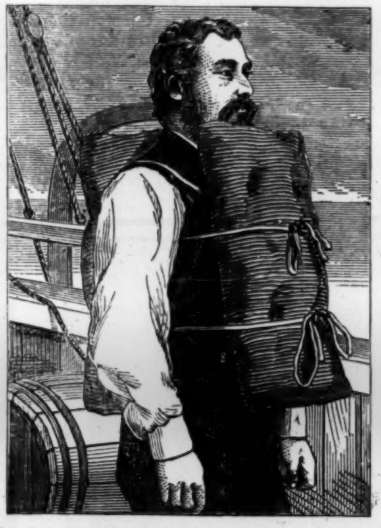

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A RECORD OF PROGRESS IN
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INCORPORATING THE
JOURNAL OF THE INVENTORS' INSTITUTE.

JULY 1, 1875.

THE "RADCLIFFE OBSERVER" ON SCIENCE AND THEOLOGY.

We give our most prominent position, as being well worthy of it, to the analysation of the address delivered by the Rev. Robert Main, F.R.S. (Radcliffe Observer), at the ninth annual meeting of the Victoria Philosophical Institute. After adverting to the work of this important institution in placing science and religion in amicable accord, he stated that the subject which had to be discussed in the address, as belonging mainly or wholly to the past year, was far from being a pleasant one. It was, in fact, Atheism, which, in various forms, had been brought back into the light of day, and rendered accessible to general readers in various publications by men of ability and great reputation. As a preliminary to the consideration of this subject, a definition of God was then given, which equally excluded the Pantheistic and the Epicurean idea. It was then assumed that no physical theory could be considered to be of any value which pretends to account for the origin of the Cosmos, or of the human race, and which does not also give a satisfactory explanation of the adaptation of surrounding circumstances to man's moral and intellectual nature, and to his capacity for enjoyment. With a few words devoted to Darwin's "Theory of Evolution" and the "Descent of Man," Mr. Main concluded the introductory portion of the address.

The address itself was of three sections:—

1. A sketch of most important discoveries in physics, chiefly astronomical, which have been made during the last few years.
2. A slight review of some of the most startling assumptions in two recent publications,—namely, Mill's "Essay on Theism," and Strauss's "Old and New Faith."
3. A consideration of the Atomic Philosophy in connection with Dr. Tyndall's Belfast address.

After allusions to the recent observations made for the correction of the Sun's parallax, including those of the transit of Venus, the address proceeded to give, with some detail, the discoveries which owe their origin to the spectroscope, including the knowledge which has been derived of the material elements of the Sun himself, the stars, and the nebulæ, and of the linear velocity of certain stars. Attention was also drawn to the great additions made to our knowledge of comets by the discovery of the identity of the orbits of two of them with those of the August and November meteors, and also by the spectroscope; and, finally, to the speculations of Sir William Thomson about the origin and probable diminution of the solar heat, or the gradual dissipation of the solar energy; and remarks were made on the relation of these grand and important discoveries and speculations to religion.

Extracts were then read from Mill's "Essay on Theism," containing certain admissions about the Being of a God, and the probability both of a revelation and of the intervention of miracles, which are of great interest and importance. The extracts from Strauss's "Old and New Faith" were made to show his complete abnegation of all religious belief in his later years, and a degree of religious degradation which is believed to be almost unparalleled in ancient or modern times. Extracts were also read from a recent charge of the Bishop of Oxford, in which he asserts that a great deal of infidelity exists in the University of Oxford, and that it is not confined to the junior students.

Lastly, the subject of the Atomic Philosophy was treated of, and a brief sketch was given of the modern theory, which rests on a basis of indisputable facts (chiefly chemical). The modern kinetic theory of molecules had already made great progress, and physicists thought that they could even now measure, weigh, and determine for different substances the velocities of those exceedingly minute fundamental elements of the universe; while, at the same time, a wide field was opened for future research and experiment, but chiefly in the correction of the numerical values of the elements already obtained.

The remainder of the address was devoted to the ancient atomic philosophy; without, however, entering into details of the theories of Democritus, Epicurus, and Lucretius, as they are utterly valueless in their relation to the correct modern theory, and the interest in them was rather literary than scientific. The portion of the Belfast address which treats of the atomic theories was criticised chiefly in connection with the inadequate scholarship which was displayed; and "the possibility," even by the use of imagination, "of passing the boundary of the experimental evidences, and of discerning in matter the promise and potency of all terrestrial life," was denied altogether.

The address concluded with these words:—

"With regard to physical science, I think we have seen that its real advances are in favour of religious faith. The mysterious atom in which some can see the 'promise and the potency of all terrestrial life,' has, to my mind, brought God nearer to us. We now see the elements of which it has pleased Him to make the worlds; we see the presence of that one Supreme Intelligence as distinctly in the weed that grows and the flower that blossoms on our own planet, as in the stars and nebulæ, which at still unmeasured or unimagined distances reflect His glory and proclaim His unvarying laws."

At the conclusion of this address, on the motion of the Lord Mayor, there was a vote of thanks, after some remarks by Lord Shaftesbury, Lord Harrowby, the Bishop of Llandaff, and others, which, we hope, will prove encouraging to Mr. Main.

Reviews.

GENERAL SCOTT'S SEWAGE PROCESSES.

"A Compendious Statement of the Nature and Cost of Certain Sewage Processes." By Major-General SCOTT, C.B. London: Printed by Nissen and Arnold, 43, Mark-lane, for Scott's Sewage Company, Limited, 26, Great George-street, Westminster. 1875.

THIS pamphlet gives a very lucid *exposé* of General Scott's processes, showing that they effectuate a rational, sanitary, and commercially available system of dealing with our sewage. The work consists of a number of short chapters, headed by opinions and dicta of various men eminent in practical science, which are either directly in favour of the General's inventions, or are shown to be, when properly considered, favourable thereto.

After quoting opinions by Mr. W. Hope, V.C., Dr. Odling, Dr. Frankland, Dr. Voelcker, Professor Sir T. Hawksley, Mr. Bramwell, Mr. R. Grantham, and Dr. Letheby, our author, alluding to several statements of a favourable character quoted by him, says:—It is unnecessary to add to the quotations which stand at the head of this chapter any further commendations of the cement process. Amongst those who consider it to be the best plan yet proposed for the disposal of the sludge are the most distinguished of the scientific men who have made the sewage difficulty their study. Most of the objections, with the exception of those relating to cost, that can be raised against a process of this description are met by statements of a very explicit and authoritative kind. The farmer and the agricultural chemist declare that the effluent is, at least, not injured for irrigation purposes; the chemist states that, after the process, filtration can be carried out on one-sixth of the area required for raw sewage; chemists and engineers agree in the fact that excellent cement can be made from the sludge, and that, looking to its small agricultural value, this is the best purpose to turn it to; and all are in accord upon the fact that the process can be carried out without creating a nuisance. The opinions, too, of these eminent men have been confirmed by experience at Birmingham and elsewhere. It therefore only remains for us to give the estimate of the actual cost of the process. This is as follows:—

52,000 tons of sludge, reduced by drainage to 30,000, at 3d. per ton	£650	
30,000 tons dried, yielding 5,200 tons of dry material, at 7s. per ton dry	1,820	
5,200 tons, burned to 2,600, cement, ground and bagged, at 7s. per ton burned....................	910	
Interest on £8,000 capital, incidental to cement process, at 10 per cent......................	800	
		4,180
Value of 2,600 tons of cement, at 35s.		4,550
Balance profit		£370

Or nearly 9-10d. per head in aid of the rate for clarifying the sewage.

In other words, the cement process shows an advantage of 6d. per head, as compared with the other plans which we have previously considered for dealing with the sludge.

The cement process is adapted specially for large towns with a rapidly increasing population. In such cases a ton per week for every 2,000 persons is an amount which could be readily got rid of. The process is manifestly unsuited for places where the yield of cement would be too small to constitute a "manufacture."

The agricultural lime process, which is almost similar to the cement process (the only difference being the absence of the necessity of grinding in the former), can be carried out in smaller towns than the cement process, as the dry sludge can be stacked and left to await the period of the year at which agricultural liming is carried on before it is calcined. The operation is, however, manifestly only suitable in localities where liming the land is extensively resorted to; but in such localities, owing to the value imparted to it by the phosphoric acid, the sewage lime can be more profitably carried than ordinary lime.

The expense of its preparation may be regarded as being a fraction under that attending the manufacture of cement, and the theoretical value of the product as about the same as the value of the cement. In the case of a trial at West Ham, Dr. Voelcker reported that the phosphoric acid in the calcined sewage deposit increased the value of the ton of lime by "just about £1 in round numbers," and in all the foregoing estimates we have assumed the value of the lime to be 15s. per ton, making a total of 35s., which is the same value as that which we have assigned to the cement. We could not assume in practice, however, a value of more than 30s. for phosphatic lime for agricultural purposes.

Other chapters of the work refer to an Improved Calcination and Manure Process, and to the Profitable Utilization of Excreta.

NUMBER.

"Number: a Link between Divine Intelligence and Human." An Argument By CHARLES GIRDLESTONE, M.A., Rector of Kingsromsford, Staffordshire; late Fellow of Balliol College, Oxford. London: Longmans, Green, and Co. 1875.

THE object of this little work is, as the author states in a prefatory note, to offer for consideration the following argument; tending as it does to prove, on grounds of reason generally intelligible, rather than technically scientific, the essential spirituality of humam nature. For the more thoroughly man can be convinced, not only that God is a spirit, but moreover that he himself, though he has a material body, yet in respect of his higher faculties is a spirit akin to his creator, the better will he be prepared to reject those materialistic notions, which would hinder him as a philosopher from believing in the true God, and as a believer from worshipping that God in spirit and in truth.

In fulfilling his task, the author refers to number and its properties as invariable; the numerical law of gravitation; the universality of this law as indicating one lawgiver; the faculty of number as belonging to man and not to brutes; to the numerical laws of planetary motion and the universal application of these laws; to astronomical forecasts as confirmed by experience; to the numerical law of chemical combination. He then gives illustrations of this argument from other sources, and objections to the argument are stated and answered; and he avers that a divine intelligence may be discerned in the world by man, and that human intelligence is linked by number with that which is divine. As to this latter, as connected with number, he says to the anti-theistic philosophers, "Let them listen to the voice of number, if they will listen to no other, telling them—ye are scions of a heavenborn race, and though every atom of your bodies be of the earth earthy, yet there is that within you which is after the likeness of the Father of your spirits, an inborn gift derived from Him given to your family, and to yours only of all His creatures here below; a trait of family resemblance ineffaceable, however far you may have fallen from your high estate, and still answering, however faintly in most of you, and imperfectly in all, to the same faculty in Himself, even as an impression corresponds, in a material ever so inferior, with the seal impressing it."

The work is without doubt an interesting and instructive contribution to the controversy on the supposed antagonism of science and religion, and as such we commend it to our readers.

PROFESSOR VON COTTA'S DEVELOPMENT-LAW OF THE EARTH.

"The Development-Law of the Earth." By Professor BERNHARD VON COTTA. Translated by R. R. NOEL. London and Edinburgh: Williams and Norgate. 1875.

THIS small book compresses into forty-three pages all the speculative or inductive science as to cosmogony, and is well worthy of the attention of all intelligent people, for whether they agree with the theory propounded or not, they will, nevertheless, be interested and instructed by its perusal.

The nature of its contents may be judged from the following statement in the preface: —Darwin's explanation of the origin of organic species—the greatest advance in the domain of biology—is mainly founded on the continual accumulation of small changes through inheritance. Like Lyell's explanation of the structure of the surface of the earth, through processes still in operation, it presupposes an enormous lapse of time, excluding everything miraculous, *i.e.*, not in accordance with natural laws.

Cotta's "Development-Law of the Earth," which embraces the whole material world—the inorganic as well as the organic—likewise rests essentially on an analogous foundation, particularly on the leading principle that every process (every motion) is of necessity followed by positive results which never entirely vanish, and to which, consequently, *summation* is ever applicable. By this continual accumulation of results (changes), it follows that an ever increasing manifoldness and differentiation of things necessarily obtains—the sum of particulars becoming greater by every addition of new. From this, however, it does not follow that we should thus be able to explain every fact, every problem, since knowledge of all the separate acts or processes of change is wanting. In principle the law suffices, but its special application is only in those cases possible where sound observations have been sufficiently numerous.

As is made clear in the following essay, Professor V. Cotta's development-law excludes every limitation in our conception of time, as well as all miraculous processses, *i.e.*, such as are not in agreement with the laws of nature.

The whole theory may perhaps be apprehended from the following extracts:—

The manifoldness of visible forms is a necessary consequence of the *summation* of the results of successive antecedent processes; or more briefly, the manifoldness of visible forms is the result of separate processes. The longer this summation has continued, the more single results one after the other it accumulated, the greater its product became. Thus in the present state of the earth, we have now before us the most manifold end-result, which, however, naturally does not represent an actual, but only a momentary, ending.

After carrying us through seven stadiums we reach the following summary of this theory:—Succession of effects.—1. Gravitation. 2. Heat (light, electricity, &c.), radiation. 3. Chemical affinity (crystallization), water. 4. Organisation, ice. 5. Mental-action. Succession of processes.—1. Conglobation of matter, and consequently immense temperature of the gas-ball. 2. Through the radiation of heat into colder universal space, a part of the gaseous substances enters into a fluid state. A fluid nucleus is surrounded by a gaseous covering. 3. Through further cooling, a part of the fluid nucleus solidifies. A firm crust, consisting of mineral substances, is formed on the fluid nucleus, surrounded by a gaseous covering. 4. Through still greater cooling, the formation of water on the surface of the solid crust becomes possible; and thenceforth the effects of water. Between the solid crust and the gaseous covering an uninterrupted aqueous layer is formed. 5. After a certain decrease of temperature, organic substance-combinations are formed, and from these organisms, whose manifoldness continually increases, like that of the inorganic conformations. 6. Differences in the sun's irradiation become marked; climate-zones, and, lastly, ice-regions obtain. Henceforth are the effects of ice. 7. Mental life becomes more and more developed in the animal kingdom, and attains its present maximum in man.

THE POTATO DISEASE.

"The Potato Disease, and the Curl Disease in Potatoes, their Causes and Prevention, with Strictures on the Potato Fungus *(Peronospora Infestans)*." By Eccles Haigh. London: George Philip and Son, 32, Fleet-street. Liverpool: Philip, Son, and Nephew, 49 and 51, South Castle-street. 1875.

The author of this short and interesting treatise is one of those who think for themselves, and do not accept a theory because it has the sanction of great names, and is generally received as correct.

He combats the theory that the modern potato disease is a fungus, and his remarks are very sensible, and worthy of attention. At the same time, after allowing them full weight, we do not see that the fungus theory is disproved.

Mr. Haigh considers that the cause of potato disease is over-stimulation by use of too highly nitrogenized manures, such as guano and others now so much in request in "high farming." The following extract will give a notion of our author's views, both as to the old "curl" and the present potato disease:—

"During the curl period the plant ran its natural course, became fully matured, and bore seed-apples. By the formation of the seed-apples, the plant and tubers were relieved of that portion of the moveable nitrogenous matter which they did not require, but which was so indispensable to the formation of the seed. As the tubers were therefore left with no more than a normal amount of this matter, they kept sound when stored up for winter use. But when this seed formation became excessive, the plant and tubers were subject to become so closely drained of this matter, that the tubers, when used as sets the following year, were incapable of supplying sufficient nourishment for healthy germination—hence the curl disease, as well as the reason for this disease always occurring at the earliest stage of the plant's life. The potato disease, on the contrary, attacks the plant at its approaching maturity; first, because this is the most critical time of the plant's life—the period when its energies are diverted from plant and tuber formation to that of seed formation; and, secondly, because the energies of the plant having by this time become exhausted by producing plant and tubers, they are incapable of the effort of performing their last services, the seed formation. At this juncture the plant comes to its sorry termination. By the non-formation of the seed, the plant and tubers are not relieved of their surplus and superfluous nitrogenous matter; this is left in excess in the wrong place, unassimilated, where nature never intended it to be left; and hence, when the tubers from such plants are stored up for winter use, though apparently sound, they are subject to putrefy, to 'go bad.' At the same time, tubers in this condition, whether they show the disease or not—provided, of course, they retain a single sound bud or eye—when used as sets the following year, 'sprout with remarkable rapidity,' and for the very reason that they contain a superabundance of this matter. For these several reasons the curl disappeared simultaneously with the advent of the potato disease."

As to prevention of diseases, Mr. Haigh recommends compliance with but two simple forms:—Regenerate through the seed two or three times, and abstain, as nearly as practicable, not only from nitrogenous artificial manures, such as guano, sulphate of ammonia, rape-cake, and nitrate of soda, but also from strong farmyard manure, such as stable manure, and that produced by cattle fattened on such food as oil-cake; that furnished from dairy establishments and cow byres approaches to the type of what I would recommend as nearly as can be practically conformed to.

These two points require a few words of explanation. It is necessary, as a commencement, to select a variety, or perhaps varieties (for I have much faith in crossing), of such desirable kinds as are procurable, but, as a matter of course, such only as yield and mature seed-apples; and it is of the utmost consequence that these seed-apples should be thoroughly ripe. Sow the seed from these apples the following spring, and in autumn they will have produced diminutive seedling potatoes. Select the finest and healthiest in appearance of these, and plant them the following spring; by autumn these seedlings will have produced much larger potatoes, from which select again the finest and healthiest for planting the spring following, and so on. In either the first, second, or third year, the most vigorous plants will have produced seed-apples; and when seed-apples are produced fine enough and thoroughly ripened, you are in a position to commence the second regeneration. With this proceed as with the first, and repeat the process a third time. The seedling potatoes from the first generation will almost necessarily contain some diseased tubers, and all the more if grown in dark, rich garden soil; but they may be expected to contain a less proportion of these than older varieties grown in similar ground, and a less proportion still if the plants have developed a strong tendency to yield and mature seed-apples. The seedling potatoes from the second generation, however, will be far more free from disease, if not altogether, than the first; while in the third generation, they may be expected to be entirely exempt. Potatoes now-a-days are far more free from disease than they were some years ago, and especially during the few years that immediately followed the commencement of the disease; and this can only be attributed to the vast number of new seedling varieties that have been raised during recent years. So thoroughly had the disease destroyed the famous old cultivated varieties, that for some seven to ten years afterwards, those left might have been counted; but at present, the varieties may be said to be almost countless. Most of them, however, if not every one, are more or less tainted with the disease, because they have been selected entirely with regard to their tuber-producing capabilities, and with an entire disregard of their seed-apple-producing capabilities. They are therefore in an unnatural and, perforce, in an unhealthy state.

DYEING.

"The Dyers' Hand-Book, containing about 200 Valuable Recipes for Bleaching, Dyeing, and Finishing on the most Approved Principle, with Patterns Dyed from White by the Process Given to Each." By F. J. Bird. Manchester: John Heywood, 141 and 143, Deansgate; London: Simpkin, Marshall, and Co. 1875.

The title-page of this little work, as above given, well describes its contents. It is a thoroughgoing technical book containing a number of valuable recipes, not promulgated with the intention of instructing everyone to become his own dyer, but for trade purposes.

It also enters into scientific matters connected with dyeing, &c., such as hydrometer tables, comparison of degrees of Baume's and Twaddell's Hydrometers with Specific Gravities. The work also contains several recipes as to matters which will interest the domestic economist.

The following extract as to a new method of dyeing and printing by means of indigo, with which the author connects the names of Messrs. Schutzenberger and Halande and Messrs. Halliday, will illustrate the character of the contents of this book:—

After having fully described the mode of preparation and dyeing, the author goes on to describe the printing process by stating that it mainly consists in printing with an alkaline solution of dissolved indigo, suitably concentrated and thickened, the colour containing, moreover, a large excess of hydrosulphate of soda. The presence of this salt keeps the indigo blue constantly in a reduced state, which would otherwise become oxidised. It thus supercedes in a much more convenient manner the use of coal gas. The printing can be carried on in common air with ordinary machines. Oxidation is so little perceived that, after an hour of working, the colour remains reduced to yellow. On the other hand, by printing on dissolved indigo, immediate fixation is secured, as the colouring matter is almost entirely utilized. Experience shows that with shades of equal depth solid blues are obtained at an expenditure of 50 to 60 per cent. less indigo than with the old process. The shades obtained are more beautiful and solid, and the design comes out more distinct and better defined. The new blue, not needing to be fixed by any subsequent process after printing, can be applied simultaneously with the majority of other colours, such as aniline black, garaneine colours—whether obtained by dyeing or steaming—catech chrome colours, albumen colours, &c. Novel styles can thus be originated which could scarcely be executed by any other process. The new colour is obtained by thickening with gum or any other suitable substance an alkaline solution of white indigo sufficiently concentrated, and adding to the mixture a sufficient quantity of hydrosulphate of soda. After printing, the indigo is oxidised by hanging up in pieces for twelve to fourteen hours. They are finally washed and soaped.

PUNCTUATION SIMPLIFIED.

"Crisp's Catechism of Punctuation, for the guidance of Printers, Painters, Newspaper Correspondents, and also for the use of Schools." By William Finch Crisp, Great Yarmouth. W. F. Crisp, Crown-road. London: J. Haddon and Co., Bouverie-street, Fleet-street, E.C.

This is a very useful little pamphlet on a subject that must interest everyone who reads and writes. The following as to that modern piece of pointing, the dash, will serve to exemplify the nature of this work:—

Q. What is a dash?

A. A short, horizontal stroke, called an em metal rule.

Q. Is it used as a mark of punctuation?

A. It is, and is one of the most useful signs of the modern school, for not only is it substituted for crotchets and brackets, or noting as a figure in syntax an ellipsis (the omission of certain words or letters, as K—g for king) but is found to answer admirably in sentences where neither the semi-colon or colon would be appropriately applicable, particularly in poeting and blank verse.

NOTES ON BUILDING.

"Construction Arranged to meet the Requirements of the Syllabus of the Science and Art Department of the Committee of Council on Education, South Kensington. Part I.—First Stage in Elementary Course." Rivingtons, London, Oxford, and Cambridge. 1875.

This is a most valuable work, as being a real text-book for technical education; not such a one as many professed books on that subject are, a mere smattering statement of some general elementary principles, accompanied by some salient instances of their applications, but a work that a real handicraftsman may peruse with interest and profit as affording him an insight into the *scientier* of his art, and important information as to its correct practice.

In the several chapters of the book information is given as to walling and arches, brickwork—that important subject "bond" being very fully dealt with—and masonry, carpentry, floors, partitions, timber roofs, slating, plumbers' work, cast-iron girders, bressemers, and cantilevers, as also joinery, are fully and practically dealt with.

In short, the work is a complete technical expositor as regards the first stage or elementary course; indeed, beyond it, and the only matter on which we would offer any suggestion, is one that has, perhaps, more to do with the curriculum of South Kensington than this work, namely, that the points of geometry, physics, and other sciences involved in the technical matters dealt with should be put before the student, for what we want is to render our skilled workmen scientific workmen also.

Correspondence.

THE CONFERENCE ON THE NEW PATENT BILL.

To the Editor of the SCIENTIFIC AND LITERARY REVIEW.

Sir,—I beg you will allow me to correct a statement made in the last number of the REVIEW, of what I said at the Conference on the new Patent Bill. It is there stated that I said "All that was wanted was to increase the examiners and to put the 11th clause *of the Bill* into force."

From the first I have, and do now, consider the 11th clause of the Bill one of the most objectionable, and the only saving point to be the providing examiners, supposing that there should be a sufficient number of them to be able to examine all former patents, so that one invention should not be patented over again to which their action should be restricted, and what I said at the meeting was that what was wanted in the present law—not the proposed new law as the report makes it appear—was to increase the number of examiners and to put the 11th clause of the paper of resolutions of the preliminary conference I held in my hand into force.

A copy of this paper was given to each person at the Conference, and the 11th clause stated:—"It being recommended that the total cost for obtaining the great seal should not exceed ten pounds; also, that a provisional or preliminary protection should be obtainable for one pound; likewise, that days of grace for payment of stamp duties be allowed on payment of a moderate penalty."

Hoping you will find space in your next number for this correction, I am, &c.,

M. PRIOR.

Sheffield, June 12th, 1875.

⁂ The paper Mr. Prior referes to was published in our last issue, and headed "Meeting of Deputations of Various Bodies on the New Patent Bill."

A PEOPLE'S MUSEUM OF PHYSICAL ASTRONOMY.

To the Editor of the SCIENTIFIC AND LITERARY REVIEW.

SIR,—Allow me to introduce to the notice of your readers a scheme for a museum for the above purpose to be erected and endowed by Government, holding the same relation to astronomy as the museum of practical geology in London holds to geology, &c.

This should be a museum worthy of the intelligence and wealth of this great country, in which the whole visible universe is roughly presented to us, exhibited upon a colossal yet exact scale, and wherein the actual motions of the heavenly bodies are visible to the naked eye, wherein vast space can be spanned by the hand and great epochs of time counted with ease by the mind.

Here the very planets themselves, with all their varying rotundities and surfaces, can be leisurely and minutely scrutinised, and even touched.

Foremost (whether moved by clockwork or otherwise) we should see that colossal planetary machine, the Orrery, which illustrates and explains the motions of the heavenly bodies, their relative sizes and distances from the sun, &c., so plain, so large, and so visible, that those who "run could read."

We should see the earth revolving on its axis once in twenty-four hours, the moon revolving round the earth in twenty-eight days, and even the revolution of the sun itself, and so of the rest.

We should be able to examine closely the surface of the moon, its mountains (three times the height of our own) and its immense crater-like basins, and so especially of the surface of the great sun itself (but dressed only in her latest garments of discovery), we mean her layers of gaseous clouds of iron, copper, zinc, &c., her solar spots, their size, number, and situation, and of the red flames (of hydrogen) or prominences 100,000 miles in height.

We should be able to examine also closely a colossal model of the surface of the planet Mars, its continents and seas, their size and form, as near as astronomers can guess (for in such a museum as this they must come out of their observatories and be up and doing)!

We should see large models of stars of different magnitudes, even to the sixth, the faintest.

We should stand within a gigantic dome showing the stars of the Northern Hemisphere, and a similar one of the Southern.

Large models of some of the most remarkable comets, with the exact form of nucleus and tail, and especially the three or five with their periodicity of orbit, showing their behaviour as they approach and recede from the Sun, most probably (the writer thinks) from the Sun's *repellent exhaling influence* (not alone upon this young planet in its protoplasm existence) but universally (comparable to the jet of water upon the pith ball in shops) the sole cause of motion, light, heat, &c., and conversely from all planets to the Sun, the sole cause of all its light and heat, &c., nothing being wasted by radiation into space; in fact, a process by Sun and Planets, and universally of exhalation and inhalation analogous exactly to our own bodies.

Besides numerous other astronomical phenomena, models of specula and lenses, telescopes, with that of Lord Rosse's, astronomical photographs, and every kind of astronomical instrument, with full and clear description of each, their uses and purpose.

If, therefore, we are denied the gifted and exalted mind and learning of an astronomer, the Museum of Physical Astronomy places us in a position at least to admire and appreciate his wonderful labours, and, above hall, that mighty handiwork of the great Creator, thus roughly brought within the direct range and cognizance of our five senses!—I am, sir, your obedient servant,

AUGUSTUS JOHN HARVEY,
F.R.G.S. and F.S.A.

1, South Bank, Regent's Park,
London, 1875.

EGERTON'S UNIVERSAL SPINDLE.

THE following is the description of this invention, laid before the meeting of the Inventors' Institute on 3rd June last:—

The object of this invention is to transfer a very rapid revolving motion from a lathe or other wheel revolving in stationary bearings, to a spindle which can be held in one hand, and (being fitted with different kinds of brushes, or other polishers, or with a drill or other implement) may be carried about and applied in a horizontal or vertical direction, to any part of an object, either fixed, or held in the other hand.

It is especially adapted to work a revolving brush for cleaning and polishing boots and shoes, knives and plate, or for polishing carved and cabinet work and furniture, or to carry a light drill, and for other domestic and industrial purposes, wherein the implement to be used is required to revolve with great velocity; and when the object to be operated upon cannot conveniently be brought up to a brush or other implement revolving on fixed bearings.

The spindle is supported in bearings on the two arms or prongs of a forked steel piece, the tail of which is firmly fixed in a wooden handle. The central part of the spindle (between the two prongs of the fork), carries a pulley or grooved wheel, which receives an elastic band from the driving wheel, by which band the spindle is made to revolve. A convenient form of driving wheel is a roller at the back of a foot lathe.

The spindle extends through and beyond the bearings on each side, and at one end has a socket to hold the brush or tool to be used, and at the other (may carry) a heavy metal disc, which maintains the motion equally.

The elastic band is kept in its place upon the grooved wheel of the spindle, by being passed through a loop of smooth rounded metal, attached to the elongated ends of the steel fork, and exactly opposite to the grooved wheel.

The elastic band may be used of any convenient length.

Additional pressure can be applied to the brush or other implement, by means of a flat-headed pin attached to the opposite end of the spindle. When the disengaged hand is pressed upon the head of the pin, its point presses against the spindle. The pin is connected with the spindle by means of a screw, and is removable at pleasure.

Thus, a brush or other implement, fitted on a spindle revolving with the speed and power derived from any kind of driving gear, may be carried about in the hand, and applied in any desired direction, as particularly described and ascertained in the above statement.

In the discussion which followed the reading of Mr. Egerton's paper, Mr. VARLEY, Mr. CALLEY, and Mr. MURRAY expressed opinions in favour of the invention.

ELECTRIC CONDUCTIVITY OF GLASS.

AT the meeting of the Physical Society on the 12th ult., Prof. Gladstone, President, in the chair, after Lord Lindsay, Sir W. Thomson, and Prof. Sylvester had been elected members, Mr. W. Whitehouse described some experiments he had made "On the Electric Conductivity of Glass." He employed pieces of thermometer tube about an inch in length, into the bore of which two platinum wires were inserted in such a manner that there was an interval between the points. In some cases, one wire of platinum occupied the entire bore of the tube, and this tube was surrounded on its external surface by a helix of wire of the same metal. In each case the arrangement was introduced into a circuit in which were also placed a Thomson galvanometer and a set of resistance coils. It was shown that at the ordinary temperature there was no deflection, but that the current passed freely when the glass was heated to redness. The difficulty of making contact with the glass led Mr.

Whitehouse to use two test tubes, one inside the other, both containing mercury, with which wires of platinum freely communicated. The flame of a Bunsen burner was applied to the outer test tube, and the temperature of the metal noted by the aid of a thermometer. In one series of experiments the diameter of the internal tube was $\frac{5}{8}$ths of an inch, the length in contact with the mercury about $3\frac{3}{4}$ inches, and the thickness of the glass 1-100th of an inch. A current was first observed to pass at 100° C., and as the temperature rose the amount of deflection increased. The following are approximate measurements of the resistance of the glass at different temperatures:—At 165° C., resistance=229,500 ohmads; at 185°=100,000; at 210°=69,000; at 255°=22,500; at 270°=9,000; at 300°=6,800.

DOUBLE DECOMPOSITION OF SALTS.

THE President of the Physical Society, Prof. Gladstone, at a recent meeting of the members of the Institution, read a paper, "On the Time Required for Double Decomposition of Salts." It is well known that if, on mixing solutions of two salts, MR and M'R', an insoluble body can be produced by an interchange of metals and radicals, that body is produced to the fullest extent possible. The only explanation of this fact which has been given is founded on the theory of Bertholet, that in all cases of mixture there is a re-distribution of the constituents according to their relative affinity and mass, with the production of more or less MR' and M'R. Now, if one of these, say MR', be insoluble, it will remove itself at once from the sphere of action; but this will necessitate a fresh distribution of the constituents with the production of more insoluble salt, and so on, until the whole of the M has entered into combination with R'. Dr. Gladstone commenced this research twenty years ago, and added, in a note to a paper in the *Philosophical Transactions*,—"It is easily conceivable that when the affinity for each other of the two substances that produce the insoluble compound is very weak, the action may last some time and become evident to our senses. Is not this actually the case when sulphate of lime in solution is added to nitrate of strontia, or carbonate of soda to chloride of calcium, or an alkaline carbonate to tartrate of yttria, or oxalate of ammonia to sulphate of magnesia? &c." The president gave several experimental illustrations of the time required for double decomposition. He showed that ferric chloride and sulphocyanide of potassium re-act instantly; that citrate of iron and meconic acid, chloride of platinum and iodide of potassium, re-act gradually. The rate of change really depends on the degree of rapidity of the inter-diffusion of the salts. It is also affected to a very great extent by temperature.

LIGHTNING CONDUCTORS.

AT a recent meeting of the Meteorological Society, Dr. R. J. Mann, President, in the chair (after Dr. J. I. Mackintosh, Messrs. W. Musgrave, R. E. Power, J. E. Smith, and J. Watkins, had been elected Fellows), the following paper was read:—"On some Practical Points connected with the Construction of Lightning Conductors," by Dr. R. J. Mann. The paper dealt especially with the material and dimensions of conductors, the nature and influence of points, the essentials of earth contacts, connection with metallic masses forming a part of the construction of building, the power of induction in producing return shocks, the dangerous action of metal chimney-pots upon unprotected chimney shafts, and the facility with which houses may be efficiently protected when the defence is made part of the original design of the architect. The conditions which were finally insisted upon as indispensable to efficiency of protection were: 1, ample dimensions and unbroken continuity in the lightning rod; 2, large and free earth contacts, with frequent examination by galvanometers of the condition of these to prove that they are not in process of impairment through the operation of chemical erosion; 3, the employment of sufficient points above to dominate all parts of the building; 4, the addition of terminal points to the conducting system wherever any part of the structure of the building comes near to the limiting surface of a conical space having the main point of the conductor for its height, and a breadth equal to twice the height of that point from the earth for the diameter of its base; 5, the avoidance of all but elevated conducting divergencies within striking distance of the conductor, and especially such dangerous divergencies of this character as gas pipes connected with the general mains, and, therefore, forming good earth contacts.

SMALL OSCILLATIONS OF THE BAROMETER.

AT the meeting of the Meteorological Society on the 19th May, Dr. R. J. Mann, President, in the chair, a paper, "On Certain Small Oscillations of the Barometer," was read by the Hon. R. Abercromby. These small oscillations of the barometer (sometimes called "pumping") have long been associated with gusts of wind, but the precise nature of their action has not been determined. The author gives two examples as typical: 1, window looking south, wind nearly south, in strong gusts. In this case the first motion of the barometer was always upwards about 0·01 inch, as if the effect of the wind being arrested by the house was to compress the air in the room; 2, a corner house, one window to the south, another to the west, wind south, in strong gusts. With the west window open, there were violent oscillations, but in this case the first motion was always downwards. On opening the south window as well, the pumping ceased. The explanation seems to be, that the wind blowing past the west window drew air out of the room, but when the south window was open as much air came in as was drawn out, and the pumping ceased. It is well known that many acute diseases are aggravated by strong winds; and the author has observed this distress to be associated with the pumping of the barometer. He suggests the following practical method of palliation: if windows can be borne open, try by crossing, or otherwise altering, the drafts to diminish the distress. When, as in most cases, windows cannot be open, all doors and windows should be closely shut, as well as the vent of the chimney if there is no fire; and, if possible, the patient should be moved to a room on the lee side of the house. "Proposed Modification of the Mechanism at present in use for Reading Barometers, so that the third Decimal Place may be obtained absolutely," by Mr. R. E. Power.

TRADE MARKS IN GERMANY.

BY the new law respecting trade marks, which was passed the 30th of November, 1874, and comes into operation on the 1st of May next, foreigners, whose countries have a reciprocity treaty with Germany, will be entitled to the same rights and privileges for their trade marks as Germans. This protection, however, will only be accorded under the following conditions: The trade marks with explanation thereof will have to be registered at the Handles-Gericht, Leipzig, (*vide* sec. 20 of the Act) and the owner will have to submit to the jurisdiction of the Court in all cases of dispute. Further, he will have to show evidence that he has fulfilled all necessary conditions for the possession of the same in his own country, and that he has full right and title to it. On presenting the trade mark for registry, it must be accompanied by four duplicates, each of which must not be of greater dimensions than three centimeters long by three broad. The registering fee will be 50 marks, in addition to which there will be an extra fee of six marks, which will be appropriated to defray the expense of a publication of the trade mark in the *Deutscher Reichs-Anzeiger*. In the event that two trade marks of a similar design are presented for registration, the first presented will have the preference. Herr Dr. Grothe (172, Alte Jacobstrasse, Berlin, S.W.), Civil Engineer and editor of the *Allgemeine Deutsche Polytechnische Zeitung*, is prepared to undertake the registering for foreigners. To those wishing to obtain information respecting the legal formalities, Dr. Landgrafs' book "Deutsches Reichsgesetz betreffend den Markenschutz," can be recommended; it is to be procured of F. B. Metzler, Stuttgart. The people of the following countries have the right to this protection of trade marks subject to the conditions above stated: France, Great Britain, Italy, the United States of North America, Austria, Portugal, Russia, Sweden, Norway, and Switzerland.—*International Gazette*, Berlin, April 10, 1875.

KENNY'S PATENT BUTTON-HOLE BEAD.

WE are glad to find that Mr. Kenny's invention (which is being manufactured by Messrs. Lutwyche and Kenny), is obtaining the general approval of the trade. The addition to the strength of the button-hole, as an effectual preventitive of the bursting away, now so common in boots where the button-holes are either "raw edge" or oversewn by hand or machine being recognised as very important, and the considerable improvement in the neat appearance of the boots, in forming a uniform bead round the button hole, perfectly pliable, from being corded and blocked neatly in the form suited for a button-hole, and their readiness for insertion, as being capable of being stitched in by the ordinary sewing-machine, being likewise approved of; also the saving effected by their use in lieu of the hand-made or over-sown button-holes being considerable, and the moderate cost of this useful appliance having already induced several of the largest houses in the trade to adopt them in the manufacture of their button boots.

THE PATENTS FOR INVENTIONS BILL.

AT a meeting of the London Association of Foremen Engineers and Draughtsmen, recently held at the Cannon-street Hotel, under the presidency of Mr. Joseph Newton, it was, on the motion of Mr. Lloyd Wise, seconded by Mr. W. Smith, unanimously resolved:—

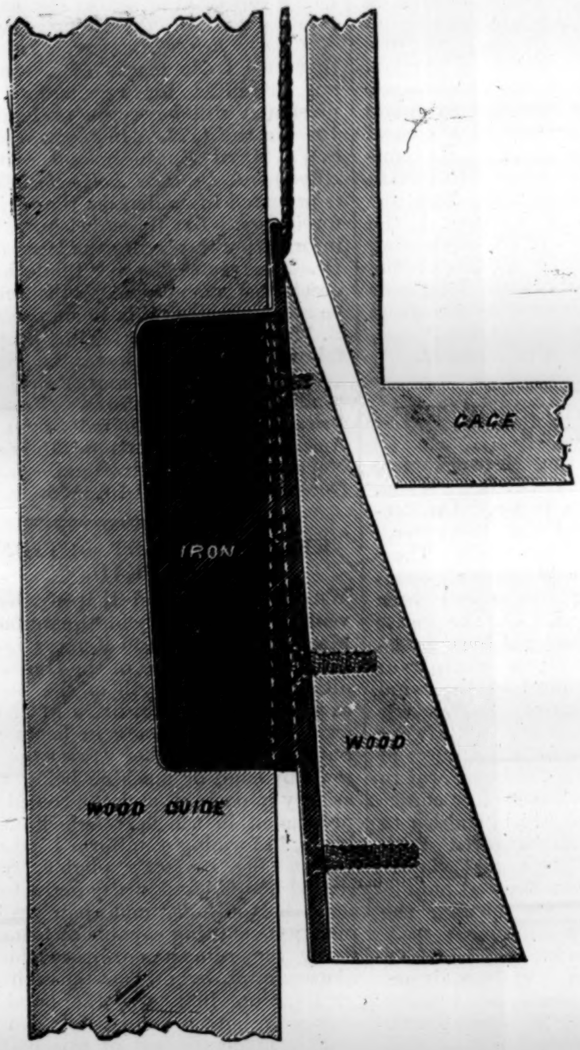
1. "That in the event of its being determined to provide for the preliminary examinations of applications for letters patent, such examination should be confined to the questions: whether the invention is for any manner of manufacture, whether the specification is clear, and whether the invention appears open to objection on the ground of want of novelty, as far as can be ascertained by such examination as prescribed of former specifications and other documents and publications in the Patent Office."

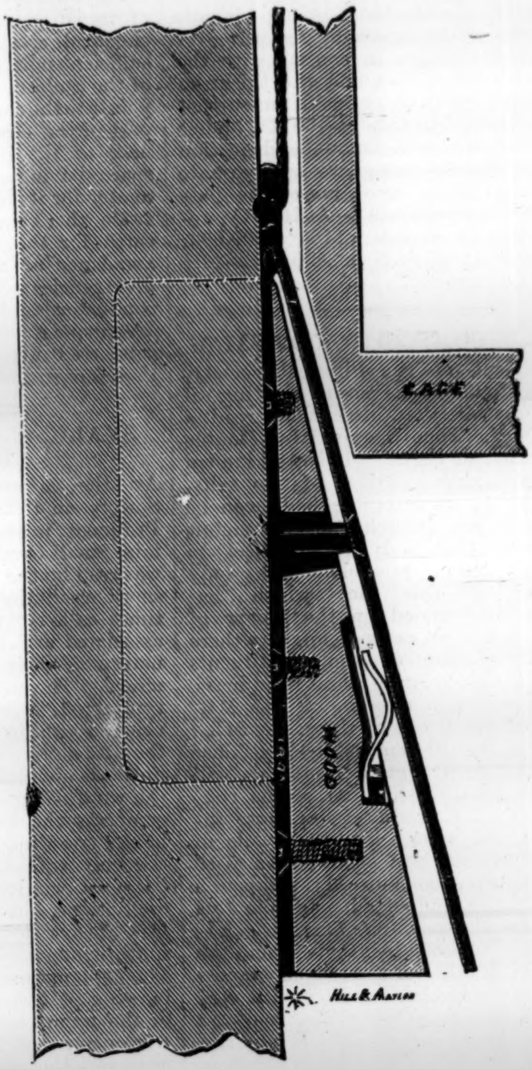
2. "That adverse judgment of the examiners should not constitute a veto upon the grant of a patent."

3. "That inasmuch as the publication of reports of examiners would, in many cases, operate unjustly against the patentee, such reports should not be made public, provided that the applicant inserts in his specification an acknowledgment of the existence of the prior matter the examiners may have found and called attention to, and a specific statement of what he nevertheless claims."

DAVIS' SAFETY APPARATUS FOR HOISTS AND LIFTS.

By H. A. DAVIS.





THE following is the substance of the paper brought before the Inventors' Institute on 3rd June ult.:—

An apparatus constructed for saving life whilst exposed to any great danger should receive that serious and important consideration its object merits. During the last century over fifty patents have been taken out for this purpose in connection with lifts and hoists, to the suspending chain or rope of which accidents are continually happening, and loss of life and great damage is generally the lamentable result. Some of these patented appliances and other non-patented contrivances have been received and applied by several manufacturers and others, but in the greater part of them there is much room for improvement, as they are not only complicated and expensive, but uncertain in their operation; and, therefore, cannot be relied upon with any certainty. In ascending or descending any distance by means of a lift, one naturally feels some dread when he remembers his life is hanging by a thread, so to speak; for, whether it be chain or rope, that may at any moment break, and the inevitable consequence prove too awful a death for language to describe. The invention I have the honour to bring before you this evening has been patented in England, America, France, and other countries. It is very simple, and, as many competent judges have averred, most effective; moreover, it is capable of being readily, and at a trifling cost, attached to existing lifts or hoists, and hence will go far to render such a useful mechanical contrivance as the lift far more generally used in mansions, hospitals, and a variety of other places than heretofore the case. Mr. Davis referred to a working model as illustrating the invention, and we give two engravings, which will show that it consists of wedges, suspended independently of the lift, between the box and guide posts, by a cord or chain carried over a pulley at the top of the guide, and then connected to the existing balance weights (so as to act as a counterpoise to the cage or box), or to a separate weight, as may be deemed desirable. The only alteration required to be made in a lift as ordinarily constructed is a groove cut out of the side of the cage or box, and a small recess to take the thin end of the wedge. The wedge is constructed with an iron plate, having side lips to guide it on the wood guide, and teeth to prevent it slipping, which are driven into the wood guide in the event of accident. This iron plate or shoe is screwed to a wood wedge, which completes the main and distinctive portion of the apparatus, as shown in our first illustration. A modification of this arrangement is shown in the second illustration, where the teeth are fixed to an iron plate, which is kept back by a spring, so that the teeth do not come into contact with the wood guide until required.

After Mr. Davis had read his paper and fully explained his invention by reference to the model, a discussion ensued, in which Mr. F. H. VARLEY, the Chairman, Mr. M. M. HARRIS, Mr. CARTTAR, Mr. T. MORGAN, and Mr. CAMPIN took part, when general approval of the invention was expressed, and a vote of thanks to Mr. Davis was passed.

It may here be mentioned that Mr. Davis had exhibited and explained his model to Sir ANTONIO BRADY and other members of the Institute, on 20th May ult., when very favourable opinions of the invention were expressed.

POLLUTION OF RIVERS.

A MEMORIAL has just been presented by Mr. Forster, M.P., and Mr. Ripley, M.P., from the Bradford Chamber of Commerce, to the Marquis of Salisbury, on the Pollution of Rivers Bill. The memorialists express their approval of the effort to make further provision for effecting the greater purification of streams; but they feel that it is desirable that a question of such momentous importance to the commercial and sanitary interests of the kingdom should be dealt with in as comprehensive and practical a manner as possible, so that, while measures are taken for the purification of streams, occasion for litigation should be lessened, and serious interference with the manufacturing interests of the country avoided.

THE INSTITUTION OF MECHANICAL ENGINEERS held a special meeting on 28th ult., F. J. Bramwell, Esq., C.E., F.R.S., in the chair, when resolutions against the new Patent Bill were passed similar in effect to those voted by the Association of Foremen Engineers, given in another column.

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ESTABLISHED 1ST MAY, 1862.

Past Presidents:

SIR DAVID BREWSTER, K.H., LL.D., F.R.S., &c., from the establishment of the INVENTORS' INSTITUTE, till his decease, February, 1868. LORD RICHARD GROSVENOR, M.P.

President of Council:

SIR ANTONIO BRADY.

The Session is now concluded.

Subscriptions are payable to Mr. G. A. STRETTON, the Receiver, 4, St. Martin's-place, S.W., who is the proper official to give receipts.

F. W. CAMPIN, Sec.

Proceedings of the Institute.

AT the meeting of the Executive Committee and Council, on 3rd June, Mr. Varley in the chair, the list of the Executive Council was read over as follows:—Sir A. Brady, President, also the Vice-Presidents of the Institute, the Treasurer, Mr. M. Harris, and the Secretary, *ex officio*—(see list given in the last number of the REVIEW)—and Messrs. W. H. Barlow, H. Bessemer, Dr. McGregor Croft, D. J. McLauchlan, T. Morgan, A. J. Murray, S. Calley, C. G. Carttar, F. Ransome, Dr. C. W. Siemens, E. O. W. Whitehouse, and Mr. F. H. Varley, who was requested to act as Deputy-Chairman of the Executive Council. The Secretary brought up a Report of the General Conference on the new Patent Bill, held at the Society of Arts, on 25th May, 1875 (see Report given in our last). The Secretary also reported that in accordance with the resolution passed at the General Conference, the petitions embodying the resolutions passed thereat had been prepared, and Mr. Mundella, M.P., had been asked to present the same to the House of Commons, but owing to the illness of that gentleman the matter remained unsettled. It was left in the hands of the secretary, with instructions to apply to the Right Honourable Russell Gurney, Q.C., M.P., to present the same in case Mr. Mundella should not do so. The desirability of petitions by the Council of the Institute being presented to Parliament was affirmed, same to contain the substance of the clauses agreed to at the Parliamentary Conference or meeting of deputations at Sir A. Brady's on 28th April ult., with the exception of 8 and 9, which it was arranged should stand thus:—8. That to entail absolute forfeiture of a patent because the invention is not put in practice within two years (as in clause 27, sub-section *a*), is undesirable. 9. That the obligation to license (sub-section *b*, clause 27) is undesirable. Also, in accordance with the motion of Mr. Carttar, seconded by Mr. Calley, and carried unanimously, "That the deferred Government dues of £50 and £100, if continued, should be postponed to the fifth and tenth years respectively.

Monthly Notices.

The "Annual Record of Science and Industry," for 1864, edited by Spencer F. Bird, sustains the high character the previous issues have secured. In the long introductory chapter, Prof. Bird reviews the progress of science, theoretical and industrial; then follow short abstracts of papers in every branch of science and industry which are considered worthy of such notice. The Necrological list is continued and improved, and there is added a classified catalogue of select works on science, published during 1874.

A machine for writing spoken words has been invented by M. H. Huppinger. The *Revue Industrielle* describes the machine as being about the size of the hand. It is put in connection with the vocal organs, the instrument recording their movements upon a moving band of paper in dots and dashes. The person to whom the instrument is attached simply repeats the words of the speaker after him inaudibly. This lip language is then faithfully written out.—*Athenæum.*

Mr. H. H. Barlow, in a letter to the *Athenæum*, referring to the above instrument, claims to be the originator of the idea, a description of his invention appearing in the *Proceedings* of the Royal Society for April 16, 1874.

The Commissioners at the Geographical Exhibition have been named as follows:—Major-General Crawford, United States; Dr. Rudolf Lindau, Secretary of Legation at Paris, Germany; M. Walcher von Moltheim, Consul-General at Paris, Austria; Colonel Versteeg, Netherlands; and Dr. George Schweinfurth, Egypt. England will not be represented by a Commissioner, as neither the Geographical Society nor Government is willing to bear the expense of such an appointment, and, if the regulations issued by the Paris Committee are enforced, British maps will be excluded. The Indian Government, however, are preparing a collection of maps for exhibition.

The Toughened Glass of M. de la Bastie has been introduced by Mr. P. F. Nursey, C.E., to the Society of Arts. He made some experiments, showing how greatly the glass was strengthened by the new process. Prof. Bauer, of Vienna, says the *Athenæum*, thinks the objection to this glass is its tendency to fall into small pieces when it does break; this peculiarity he endeavours to explain. Dr. Otto Schott, in the April number of *Dingler's Polytechnisches Journal*, does the same. He thinks the phenomena of this tempered glass are in all respects similar to those of "glass tears." But this is not proved.

"Eosin" is the name used to denote a new colouring matter recently introduced. Caro is credited with its first production at the Baden Aniline Works. Hofmann has carefully examined it, and finds it to be the phthalein of dibromresorcin, having the composition, $C_{20} H_8 Br_4 O_5$.

The Royal Cornwall Polytechnic Society has issued its list of premiums and prizes, to be awarded at its next meeting in August. The list can be obtained from the secretary at Falmouth.

Atmospheric Pressure for raising Coal has been employed in some collieries, in the Creuzot mining district of France. A piston works in an air-tight tube in the shaft, to which piston is attached a cage in which the tubs of coal are placed. Air being admitted beneath the piston, the coal is at once urged to the top of the shaft, and, at the same time, more than 70,000 cubic feet of foul air discharged from the workings, while there is a corresponding entrance of fresh air.

The Astronomer-Royal on the Lunar Theory.—This work is, it appears, making so great progress that we may in a short time expect to possess more exact and convenient tables of our erratic satellite than any as yet published. Three computers are employed on this work.

Mr. George Bentham was elected an "Associé Etranger" of the Académie des Sciences of Paris at the Séance of the 24th of May for the botanical section, in the place of M. de Condolle.

Hydrogenized Iron.—By the investigations of MM. Troost and Hautefeuille, of the Ecole Normal, it has been determined that ordinary pig iron holds twelve volumes of hydrogen gas, and that manganese pig occludes to twenty-seven volumes. The researches of M. Cailletet prove that, under some peculiar conditions, iron can be made to absorb for each volume of metal 248 volumes of gas, and, for weight, thirteen parts of iron absorb one part of hydrogen gas. Upon a lighted match being applied to this iron, saturated with hydrogen, the gas burns off rapidly, with its peculiar flame.

theories of their origin and relation to Esquimaux and other races. Prof. Busk contributed a paper "On Two Beothuc Skulls." He described them as presenting all the well-known characteristics of the normal brachycephalic type of the Red Indian skull. In his second paper, Mr. Lloyd described a collection of stone implements he had found in Newfoundland, consisting of axes, chisels, gouges, spear and arrow heads, scrapers or planers, fish-hooks; also cores, flakes, whetstones, rubbing stones, sinkers, and stone vessels. Mr. P. Harrison exhibited and gave a detailed account of five photographs, from Tahiti, of Easter Island wooden tablets. Mr. H. Talor exhibited a series of thirty-four fine photographs of people of the South Sea Islands.

June 8th.—Col. A. Lane Fox, President, in the chair.—Mr. R. P. Grey was elected a Member.—Capt. R. F. Burton read two papers on ancient remains in Dalmatia, viz., "The Long Wall of Salona" and "The Ruined Cities of Pharia and Gelsa di Lesina." Salona was the Roman metropolis of Dalmatia, of which southernmost province of Austria, Spalato was at present the natural, and Zara the artificial and political capital. The "long wall" was of doubtful and debated origin, and a reference to numerous ancient and a few modern writers on it were cited, to show the obscurity in which it still remains. The author gave an account of his explorations, with detailed measurement of the ancient structure, called by some "Cyclopean," and especially pointed out the great variety of stone dressing it presented, which would afford valuable evidence in determining the style and, perhaps, the date of the work. His conviction that the "long wall" of Salona was Greek and pre-Roman rested very much upon the fact that similar constructions exist in the neighbourhood. In the Island of Lesina, the two ruins visited and described by Capt. Burton presented a remarkable resemblance, amounting almost to identity, to the long wall of Salona, and suggested that they were all the work of a single people, and that people not the barbarous Illyrians, but the comparatively civilized Greeks. Only two flint implements had been found, and those were discovered at Salona, near Spalato. The exploration of the Dalmatian Islands was attended with much difficulty, the scarcity of water was an evil to be met, and a Slavic guide was necessary unless the traveller could himself speak Slavic, for the inhabitants all belong to that race. The islands never having been previously explored (as far as the author was aware) by Englishmen, there was a large field of research for the antiquarian as well as the more general anthropologist.

ARCHÆOLOGICAL INSTITUTE.

June 4th.—Mr. O. Morgan, V.P., in the chair.—The Chairman made some observations on two early watches exhibited by Lady C. Schreiber. One is a repeater, by Coffrey, of London, the case engraved with the arms of England, France, Scotland, and Ireland, probably of the reign of Queen Anne. The other was a French watch, signed "D. Cochin," probably made for the Turkish market, having the time marked according to Turkish calculation, in Turkish characters. Also part of a watch-case, signed "G. Bouvier."—Mr. Nightingale also showed two watch-cases of the sixteenth century, one of which is almost a counterpart of one of Mr. Morgan's, from Augsburg, the other was probably from Nuremberg; also a watch of the same period, maker's name, "Nicholas Walter."—Mr. Vernon brought a knife, fork, and spoon, of early eighteenth century, Swiss workmanship, with richly-carved ivory handles, in case; also a small silver mace, said to have been that of the Watermen's Company of London, in the staff of which is a silver oar, which could be screwed on the top when the mace was used magisterially. This object had lately been sold by Messrs. Christie.—Mr. Henderson exhibited a cylindrical bronze casket, inlaid with silver, in excellent preservation. The inscription states that it belonged to the Sultan Badrooddeen Zooloo, who reigned at Mosul, in Mesopotamia, from A.D. 1222 till his death in 1259.—Mr. Tregellas exhibited an Etui case, containing knife, fork, and spoon, of early type. The case was made to be slung, and was of leather, powdered with *fleurs de lys*, and having a capital L, surmounted by a Queen's crown. It was supposed to have belonged to the Queen of Henry the Third of France. —Sir J. C. Jervoise sent a bronze ring, found at Chalton, and a piece of semi-vitrified earthenware, thought to have been used in triturating grain.—Miss Ffarington brought a pewter seal of W. de Meles (probably fourteenth century), found on the Cheshire coast, near high-water mark, and several thirteenth and fourteenth century documents, relating to the families of Meles and Ffarington.—Mr. S. Smith brought three fragment of Roman glass.—Mr. Ranking exhibited a fragment of a Babylonian tablet, probably from the Temple of Belus, inscribed in the arrow-head character, with a charm against demons or genii; also a silver medal of Maximilian the First Emperor of the Romans, A.D. 1516.—Mr. Waller brought a drawing of a portion of the Roman wall of London, lately exhumed near Newgate, upon which he made some observations.—A memoir, entitled "Notes on the Architecture of the Choir of Lincoln Cathedral, especially as to the Chronology of St. Hugh's Work," by the Rev. E. Venables, was read; and another, "On the Identification of the Roman Stations 'Navio' and 'Aquæ,' with remarks on others in Derbyshire," by Mr. W. T. Watkin.—It was announced that at the July Meeting Mr. Parker would give an account of recent archæological investigations in Rome.

ZOOLOGICAL SOCIETY.

June 1st.—Dr. Günther, F.R.S., V.P., in the chair. Mr. Sclater made some remarks on the most noticeable of the animals seen by him during a recent visit to the Zoological Gardens at Rotterdam, the Hague, Amsterdam, Antwerp, and Ghent. Mr. Sclater exhibited the typical specimen of his *Centropsar mirus* (P.Z.S. 1874, p. 175, Pl. xxvi.), and stated that he had come to the conclusion that it was a made-up skin. Mr. E. Ward exhibited the two lower canine teeth of a hippopotamus from St. Lucia Bay, South Africa, obtained by the Hon. C. Ellis. They measured, from end to end round the outer curve, 30 inches. Papers and letters were read: by Mr. G. E. Dobson, "On the Genus of Insectivorous Bats named Chalinobolus by Dr. Peters," and describing several new or little-known species of this group, which he proposed to divide into two sections, Chalinolobus and Glauconycteris,—from Mr. H. Adams, on two new Land Shells: these were proposed to be named respectively *Eurycratera Farafanga* found on a sandy plain in the south-west of Madagascar, near the Farafanga River, and *Pupinopsis Angasi*, from the Louisiade Archipelago, in the south-east of New Guinea,—by Mr. G. F. Angas, on three new species of Shells from Australia, proposed to be called *Helix Forrestiana*, *H. Broughami*, and *Euryta Brazieri*,—by Mr. A. G. Butler, on several new species of Indian Heterocerous Lepidoptera,—from the Rev. O. P. Cambridge, on some new species of Spiders of the genus Erigone, from North America,—by Mr. H. Druce, containing a list of the collection of Diurnal Lepidoptera made by Mr. J. J. Monterio in Angola, with descriptions of some new species,—by Mr. P. L. Sclater, on several rare or little-known mammals now or lately living in the Society's collection, amongst which was specially noticed an apparently new species of Muntjac, proposed to be called *Cervulus micrurus*,—from Mr. E. L. Layard, on the birds observed by him in the Fiji Islands,—by Lieut.-Col. R. H. Beddome, on some new operculated Land Shells from Southern India and Ceylon: the discoveries of true Dipplomatina in Southern India and of Nicida in Ceylon were alluded to as being of special interest,—and by Sir V. Brooke, Bart., on African Buffaloes, in the course of which he stated that he had come to the conclusion that the West African Buffalo (*Bos pumilus*) was distinct from the East African form (*Bos æquinoctialis*). Mr. C. G. Danford exhibited specimens of the Wild Goat, *Capro ægagrus*, Gm., from Asia Minor, and read some notes on the distribution, habits, &c., of that species.

June 15th.—Professor Newton, F.R.S., V.P., in the chair.—The secretary read a report on the additions that had been made to the Society's Menagerie during the month of May, 1875, and called particular attention to the following animals:—A Hairy Tree Porcupine (*Cercolabes villosus*, F. Cuv.) from South-East Brazil, and a Rock Cavy (*Cerodon rupestres*, **Max.**) from the same country: a fine example of the King Penguin (*Aptenodytes pennanti*) from the Falkland Islands, presented by Mr. Frederick E. Cobb, Manager of the Falkland Islands Company at Stanley, Falkland Islands: an example of an apparently new species of Monkey allied to the common Macaque (*Macacus cynomolgus*) presented by Dr. Marfels, Conservator of Forests to the King of Burmah, Mandalay, Burmah, and brought home by Dr. J. Anderson, F.Z.S.: an Agile Wallaby (*Halmaturus agilis*), from Queensland. An about half-grown Australian Cassowary (*Casuarius australis*), from Queensland, presented by E. P. Ramsay, Esq., C.M.Z.S.; and two Jameson's Gulls (*Laru jamesoni*), from Sydney, N.S.W., presented by C. Moore, Esq., C.M.Z.S. A letter was read from Dr. A. B. Meyer of Dresden, stating that having inquired into the statement made by Mr. Bruyn, (P.Z.S. 1875, p. 30,) that he had specimens of four species of Birds of Paradise alive in his possession at Ternate, he had ascertained that the foundation for this statement was that Mr. Bruyn expected to receive specimens of other species, but had only actually obtained examples of one of them (*Paradisea papuana*). Mr. George Dawson Rowley exhibited and made remarks on some specimens of two diminutive Parrots from New Guinea —(*Nasiterna geelvinkiana* and *N. pygmæa*). Sir Victor Brooke exhibited and made remarks on two original drawings by Mr. Wolf of the two species of Koodoo—*Tragelaphus strepsiceros* and *T. imberbis*. The latter was taken from a specimen received direct from the Juba River, Somali. The exact habitat of this species had not before been determined. Professor Owen, C.B., read a paper in which he gave the description of some bones of *Harpagornis moorei*, sent to him by Dr. Haast, which had been found in the turbary deposits of Glenmark, a locality about forty miles from Christchurch, New Zealand. This paper formed the twenty-first part of Professor Owen's series of memoirs on the extinct Birds of the genus *Dinornis* and its allies. Mr. G. E. Dobson communicated the descriptions of some new species of Bats of the genus *Vesperugo*. A communication was read from Mr. George Gulliver, F.R.S., containing observations on the sizes and shapes of the red corpuscles of the blood of Vertebrates. These observations were accompanied by a series of drawings of these objects, and by extended and revised tables of measurements. A communication was read from the Rev. S. J. Whitmee, C.M.Z.S., of Samoa, respecting the changes he had observed in the habits of feeding, roosting, and building of the *Didunculus strigirostris*. A second paper by Mr. Whitmee gave an account of the times of appearance of the Edible Marine Worm (*Palola viridis*) in the islands of the Samoan group, together with observations on its habits. A communication was read from Dr. J. S. Bowerbank, containing the fourth of a series of memoirs on the Siliceo-fibrous sponges. Sir Victor Brooke, Bart., and Mr. A. Basil Brooke read a joint paper on the large Asiatic Wild Sheep or Argalis. Of these animals they recognised eight species, viz.: *Ovis ammon*, from the Altai between the Sea of Baikal and Thian Shan; *O. karelini*, from the Thian Shan; *O. poli*, from the Pamir; *O. hemsii*, from the Alexandrian Mountains; *O. nigrim ontana*, from the Karatau; *O. hodgsoni*, from Little Thibet; *Ovis nivicola*, from the Stanovoi Mountains and Kamschatka; and *Ovis Brookei*, of which the habitat was unknown. Mr. Sclater read a paper on the Rhinoceroses now or lately living in the Society's Menagerie. This meeting closed the present Session. There will be no more scientific meetings until the commencement of the next Session in November.

MATHEMATICAL SOCIETY.

JUNE 10TH.—Prof. H. J. Smith, President, in the chair. Messrs. Hunter, Rhodes, and Wright were elected members; Mr. W. Tanner was proposed for election; and Mr. J. H. Röhrs was admitted into the society. Prof. Cayley made a communication "On some Figures of Curves in 3-Bar Motion." Prof. Sylvester spoke "On James Watt's Parallel Motion," and "On an Apparatus for Regulating the Motion of a Train of Prisms in the Spectroscope." Mr. T. Cotterill read a paper "On the Correspondence of Points Collinear with a Fixed Origin."

ASTRONOMICAL SOCIETY.

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The effect of the interposition of a $\frac{1}{4}$ undulation plate, which converts plane into circularly polarized light, was then shown, and Mr. Spottiswoode also interposed a concave plate of quartz, and exhibited the effect of rotation on the characteristic rings of quartz. Prof. Adams exhibited a polariscope adapted for showing the optic axes of crystals in which they are much inclined to each other, as in the case of topaz. The part of the instrument by which this is effected consists of a frame in which the crystal is supported between two hemispherical lenses, the common centre of which is at the centre of the crystal. The frame is capable of motion round an axis at right angles to that of the instrument. By this means each of the axes can be brought under the cross wires, and the space through which the frame is moved affords a means of determining the angle between the axes of the crystal. The crystal may be immersed in a liquid in cases in which its optic axes are too far apart to be seen in air. Dr. Mills made a verbal communication, "On Fusion-Point and Thermometry." His apparatus for fusion-points consisted essentially of a beaker, in which stood an inverted funnel, the shortened stem of which carried a test-tube, supported by a contraction at its base. The test-tube contains naphtha of high boiling point, and the thermometer and capillary tube containing the substance occupy its centre; the funnel has four equidistant semicircular cuts at the end of its stem, and six on its lips; the beaker is nearly filled with strong oil of vitriol, and has a wooden cover; on the application of heat below the beaker, warm oil of vitriol ascends in the funnel, and cold oil of vitriol descending, enters at the lips; thus an automatic stirring is kept up, and the mercury in the thermometer rises so regularly as to appear perfectly continuous in course, even under considerable magnifying power. The manner of preparing and filling the capillary tubes was described. Attention was then drawn to the "zero error" of thermometers; in thermometers which have not been much used, the zero error must always be determined immediately after experiment. It is also generally necessary to correct for the projection of the thermometer beyond its bath. This correction had been experimentally determined by the author, and required from 1,500 to 2,000 observation of temperature for each of four instruments, and its was ascertained that the well-known expression, $C = \cdot0001545\,(T - t)\,N$, given by Regnault and Kopp, is not supported by actual trial. If we write the expression thus, $C = x\,(T - t)\,N$, experiment shows that x depends on the length N exposed, and $x = a + \beta\,N$. For lengths of about 25°, x is about ·00013, and increases about ·00001 for every additional 25°. The exact values of a and β require, however, to be ascertained for each instrument. Mr. Bauerman described and illustrated a simple method for ascertaining the electric conductivity of various forms of carbon. The method, which was originally devised by Dr. Von Kobell, consists in holding a fragment of the substance to be tested with a strip of zinc bent in a U-form, and immersing it in a solution of copper sulphate. In the case of a bad conductor, a deposit of copper takes place solely on the surface of the zinc; but when a good conductor is employed, a zinc-carbon couple is formed, and a deposit takes place on the surface of and building of the *Didunculus strigirostris.* A second paper by Mr. Whitmee gave an account of the times of appearance of the Edible Marine Worm (*Palola viridis*) in the islands of the Samoan group, together with observations on its habits. A communication was read from Dr. J. S. Bowerbank, containing the fourth of a series of memoirs on the Siliceo-fibrous sponges. Sir Victor Brooke, Bart., and Mr. A. Basil Brooke read a joint paper on the large Asiatic Wild Sheep or Argalis. Of these animals they recognised eight species, viz.: *Ovis ammon*, from the Altai between the Sea of Baikal and Thian Shan; *O. karelini*, from the Thian Shan; *O. poli*, from the Pamir; *O. hemsii*, from the Alexandrian Mountains; *O. nigrim ontana*, from the Karatau; *O. hodgsoni*, from Little Thibet; *Ovis nivicola*, from the Stanovoi Mountains and Kamschatka; and *Ovis Brookei*, of which the habitat was unknown. Mr. Sclater read a paper on the Rhinoceroses now or lately living in the Society's Menagerie. This meeting closed the present Session. There will be no more scientific meetings until the commencement of the next Session in November.

MATHEMATICAL SOCIETY.

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In the case of a bad conductor, a deposit of copper takes place solely on the surface of the zinc; but when a good conductor is employed, a zinc-carbon couple is formed, and a deposit takes place on the surface of the carbon. Numerous specimens were exhibited, which showed that the conducting power is greatest in coal which has been subjected to a great degree of heat, and the lowest temperature at which this change takes place appears, in the case of the anthracite, to be between the melting-points of zinc and silver. Such experiments appear to be specially important, as giving a clue to the temperature at which anthracite metamorphism has been effected by the intrusion of igneous rock. Prof. Woodward exhibited an apparatus for building up model cones and craters. It consists of a wooden trough about 18 inches long, with sloping sides; at the bottom of the trough a bladed screw carries forward the ashes, sawdust, or other material used, to an opening through which air from a powerful bellows is forced upwards. A board, 3 or 4 feet square, with a hole in the centre, is placed over the air jet, and on this the crater is formed. Several of the peculiarities of natural cones may thus be illustrated and their structure shown by using sawdust of various colours.

The paper read on June 12th, we give in another column.

CHEMICAL SOCIETY.

MAY 20TH.—Prof. Abel, President, in the chair.—Mr. A. H. Smee read some "Notes on Milk in Health and Disease." From the results of numerous experiments he finds that, when cows are fed on sewage grass, the milk soon goes putrid, and the butter made from it is soft and yeasty, and rapidly becomes rancid. He also noticed the outbreaks of typhoid which had occurred in various places owing to sewage water having been used to cleanse the dairy utensils, or to reduce the quality of rich milk to the lowest standard permitted by law. A discussion followed, after which Mr. W. H. Deering read a paper, "On some Points in the Examination of Waters by the Ammonia Method," in which he proposes certain modifications to facilitate the application of the Nessler test and eliminate incidental errors. There was also a communication from Prof. H. Howe, "On some Nova Scotian Triassic Trap Minerals."

June 3rd.—Prof. Abel in the chair.—The following papers were read:—"On the Effects of Pressure and Cold upon the Gaseous Products of the Distillation of Carbonaceous Shales," by Mr. J. T. Coleman: he finds that 1,000 cubic feet of the gas produced in such large quantities at shale oil works, when submitted to pressure, will give about one gallon of volatile hydrocarbons fit for improving the illuminating power of ordinary coal gas; "On the Agricultural Chemistry of the Tea Plantations of India," by Dr. C. Brown, giving analyses of the ashes of tea, and the effect of fertilizers on the growth of the plant; "On the Structure and Composition of Certain Pseudomorphic Crystals having the form of Orthoclase," by Mr. J. A. Phillips; "Note on the Sulphates of Narceine and other Narceine Derivatives," and "On the Action of Organic Acids and their Anhydrides on the Natural Alkaloids, Part V.," by Mr. G. H. Beckett and Dr. C. R. A. Wright; "On the Action of Chlorine on Pyrogallol," by Dr. J. Stenhouse and Mr. C. E. Groves, with an appendix by Mr. Lewis on the crystaline forms of mairogallol, one of the products; "On Nitro-alizarin," by Mr. W. H. Perkin: this compound, obtained by the action of nitric acid on diacetyl-alizarin, dies fabrics mordanted with alumina of an orange colour, whilst the amido-alizarin obtained from it by reduction gives a fine purple; "On some Metallic Derivatives of Courmarin," by Mr. R. Williamson; and "On the Action of Dilute Mineral Acids on Bleaching Powder," by F. Kopfer.

June 17th.—Prof. Abel in the chair.—The following papers were read: "Notes on the Chemistry of Tartaric and Citric Acid," by Mr. R. Warrington. This paper gives many important particulars connected with the manufacture of these acids, and also detailed accounts of the methods of analysis—many of them new—of the various raw materials from which they are made. "On the Action of Nitric Acid on Copper, Mercury, &c., especially in the Presence of Metallic Nitrates," by J. J. Ackworth, "Decomposition of Water by the joint Action of Aluminium and Aluminium Iodide, Bromide, and Chloride, including instances of Reverse Action," by Dr. Gladstone and Mr. Tribe. "On Nitrosyl Bromide and on Sulphur Bromide," by Mr. M. M. P. Muir, "On Achrematite, a new Molybdo-Arseniate of Lead from Mexico," and "On certain New Reactions of Tungsten," both by Prof. J. W. Mallet, and "On the Action of Chlorine on Acetamide," by Dr. Prévost.

MICROSCOPICAL SOCIETY.

JUNE 2ND.—C. Brooke, Esq., V.P., in the chair.—A number of presents to the Society were announced and acknowledged. Mr. J. W. Stephenson exhibited and explained a simple method which he had devised for enabling any person to measure the angle or aperture of an objective, and a number of copies of the engraved scale employed for the purpose were placed upon the table for distribution amongst the Fellows. The merits of the plan were afterwards the subject of a discussion, in which the President and Messrs. Crisp, Slack, Stephenson, and Wenham took part. Mr. C. Stewart gave an account of the results of an examination into the minute structure of *Bucephalus Polymorphus*, and illustrated his observations by drawings and enlargements therefrom upon the black board. A discussion followed, which was sustained by the President, Messrs. Badcock, Loy, Slack, and Stewart. Mr. Slack then at some length explained the use and management of Mr. Wenham's reflex illuminator, and pointed out the means of obviating the difficulties which were found to arise when it was used in connection with objectives of large angles; further remarks upon the subject were also made by the President, Messrs. Crisp, M'Intire, Slack, and Wenham. Dr. Matthews communicated the results of an examination of some diatomaceous earth, received at the last meeting from California.

SOCIETY OF BIBLICAL ARCHÆOLOGY.

JUNE 1ST.—S. Birch, LL.D., in the chair.—The following candidates were elected Members: Mrs. E. Cable, Monsignor Capel, Rev. V. S. Coles, Prof. R. Clark, Dr. Döllinger, T. Ely, R. R. Greig, Miss S. Harris, Rev. H. T. Kingdon, Rev. G. Kieme, Admiral Ommanney, W. Payne, Canon Prothero, Rev. S. G. F. Perry, J. J. Ranson, and Miss Woodrooffe. The following papers were read: "On Ancient Metrology," by Mr. F. R. Conder,—"On the Egyptian Shawl for the Head, as worn on the Ancient Statues of the Kings," by Mr. S. Sharpe,—and "On an Assyrian Inscription in the Vatican Museum," by Mr. E. R. Hodges. Miss A. B. Edwards exhibited and described a collection of water-colour sketches made during a journey on the Nile from Cairo to the Second Cataract.

The Sanitary Review is a new monthly record of sanitary science, and devoted to all subjects which affect the health and welfare of the people; it is edited by William T. Raymond. The number for June contains noteworthy articles, amongst others, "On the Artizans' and Labourers' Dwellings Bill," by George Ross, M.D., Medical Officer of Health; "Home for Female Orphans who have lost both Parents;" "Sunday Amusements;" and "On Mr. Thomas Brassey, M.P., on the Strike."

APPLICATIONS FOR LETTERS PATENT.

March 1st (*Continued from p.* 98).—J. E. Keirby. Elastic and other packings for pistons and piston-rods of steam-engines, pumps, rams, and other similar purposes.—J. H. Kenyon and J. Kenyon. Machinery for carding cotton and other fibrous substances.—J. M. Richards. Manufacture of artificial fuel (com.)—B. Shaw, T. Crabtree, and W. Woodhead. Looms for weaving.—J. Ellis. Pianofortes, organs, and harmoniums.—J. H. Johnson. Manufacture of capsules for enclosing medicaments and other substances, and the apparatus employed therein (com.)—S. Notton. Machinery for cutting or carving in wood, ivory, stone, and other materials.—J. F. Dickson. Air and gas engines or motors.—R. H. A. Hunter. Additions to invalid bedsteads.—J White. Manufacture of chromates of potash and soda and their bichromates.—A. Smith. Brushes.—E. Edwards. Furniture castors.—(com.)—W. H. Harrison. Boxes for containing tooth powder and other such like powders.—J. H. Le Moyne. Mule and shuttle spindle.—D. F. Mosman. Method of generating and utilising steam. (Complete specification.)

On March 2nd.—752 to 771.—W. Morgan-Brown. Lamps for signalling, for railways, for ships, and for other purposes (com).—A. Burdess. Railway breaks.—E. Wright. Means of transmitting and controlling motion in machines and hand tools, applicable as a brake for railway and other vehicles. (Complete specification.) H. Smith and J. C. Haddan. Joining together the ends of railway rails. Means for stopping bottles, jars, and other hollow articles, and means for facilitating the removal of such stoppers from the articles to which they are applied.—T. Broughton, C. Brigg, and T. H. Brigg. Means or apparatus employed in preparing, spinning, and doubling wool and other fibrous material.—E. G. Brewer. Couplings in railway carriages (com).—J. Harrington and D. Watkins. Roller skates.—H. Detty. Regulating and controlling the motion of various kinds of machinery.—W. R. Lake. Apparatus for regulating the flow of gas, steam, or air (com).—T. Walker. Fastener for fastening neckties, scarves, and cravats, and other like uses.—E. Wolverson. Corkscrews, screw passers, augers, screw-drivers, and other similar hand tools.—J. Cheshire. Solitaires, sleeve links, and other like dress fastenings and ornaments.—J. H. Johnson. Snap-hooks (com.)—J. H. Johnson. Snap-hooks and similar articles (com.)—J. H. Johnson. Machinery or apparatus for the manufacture of snap-hooks, also applicable to similar purposes (com.)—S. L. Crocker. Smelting and refining copper ores and metallic copper. (Complete specification.)—W. Firth. Machinery for sinking shafts or pits, and for the driving or cutting of tunnels.—A. M. Clark. Gas meters (com.)—A. V. Newton. Means for holding and carrying cartridges (com.)

On March 3rd.—772 to 794.—J. W. Crover. Manufacture of spring washers and apparatus therefor.—A. Friere and F. Fairlie. Bobbins used in the manufacture of yarns.—B. Searle. Rails and their connections, used for the purpose of a road or other surface for wheels to run on.—Sir F. S. Gooch. Regulating the flow of liquids in apparatus employed for reducing such liquids from a higher to a lower temperature. L. Meslach. Apparatus for accumulating hydrostatic pressure.—H. A. Bonneville. Spindle for fixed machines for spinning wool and fibrous materials in general (com.)—C. Turner and H. Page. Machinery and apparatus for fleshing, scouring, shaving, scudding, burring, striking out, grounding, frizing, or removing wool or hair from hides or skins.—P. Laycock. Machinery or apparatus employed in cutting or pulverizing flocks, or mungo for flocking purposes.—G. Lawson. Machinery for excavating and removing excavated materials.—H. Lipman. Mode of protecting tea chests, and means employed for that purpose.—B. J. B. Mills. Mouthpieces for musical instruments (com.)—G. O. Goddard. Skates.—J. Whyte. Looms for weaving.—J. Ellis. Inhaler for invalids.—W. T. Sugg. Lamp burners.—Z. Shrimpton. Crochet needles.—C. Tallis and E. Cave. Bottles for containing aerated or other liquids, and closing or stopping the same, and extracting the liquids therefrom, and machinery or apparatus for filling such bottles.—T. R. Crampton. Revolving furnaces and apparatus connected therewith.—J. Collier and J. Marsden. Looms.—J. E. Lawrence and E. V. Porter. Centrifugal pumps.—W. L. Wise. Electric brakes for railway carriages and waggons (com.)—P. S. Justice. Valves (com.)—T. Dobson. Machinery for cutting and paring linseed oil cakes and other similar substances.

On March 4th.—795 to 815.—R. C. Robinson. Mode of and apparatus for manufacturing socketted pipes from clay or other plastic material.—E. Lawrance. New medicinal compound or preparation for the cure or removal of corns or other callosities on the feet.—C. M. Elborough. Meter for liquids (com.)—R. Adams. Spring hinges or door springs.—H. Bell. Machinery for the manufafacture of nails and tacks. H. B. Pare. Cap for feeding or other bottles.—E. Ormerod. Apparatus to be applied to winding machinery (used in coal and other mines) for the prevention of accidents from over-winding, which apparatus is also applicable to hoists, and for other similar purposes.—G. Lawson. Modes and means of constructing rails for railways.—G. Robson and A. Ellis. Miners' safety lamps.—M. Howley. Jackets for men and boys.—G. Laycock. Controlling horses by means of magnetic electricity.—M. A. Weir. Means of igniting gas and apparatus employed therein.—C. Elcock. Artificial animal charcoal suitable as a filtering, decolorising, and deodorising agent, and for forming into blocks for various purposes —R. George. Stoves.—D. Annan. Steam-boiler and other furnaces.—S. H. Johnson. Method of and apparatus for the manufacture of glucose.—H. Mansbridge. Railway crossings.—A. M. Clark. Pumps (com.) (Complete specification.)—S. Makaroff. Covering holes in ships' bottoms.—R. Hadfield. Manufacture of railway and other wheels.—A. M. Clark. Metallic alloy (com.)

On March 5th.—816 to 827.—M. Scott.—Manufacture of cast steel ingots, and apparatus for casting and rolling the same, parts of which are applicable to rolling iron.—E. G. C. Bomford. Machinery or apparatus to be attached to certain kinds of reaping machines for the purpose of binding into sheaves or bundles wheat or other grain cut by the said machines.—E. Chiverton. Apparatus for lighting gas lamps and burners.—W. P. Smith. Apparatus or mechanism for interlocking railway signalling, switch and facing-point apparatus.—W. L. Wise. Continuous horizontal apparatus for washing or absorbing gas or vapours, or for distilling liquids (com.)—R. Jewsbury. Action for holding or releasing cords, ropes, or bands.—T. McGrah. Sewing machines and sewing machine stands.—G. Beaumont. Fittings of window sashes for railway and other carriages, and for other purposes.—W. Lupton, H. E. Lupton, and J. C. Lupton. Self-acting side temples used in looms for weaving textile fabrics.—R. C. Anderson. Apparatus for generating steam.—J. H. Johnson. Traps or apparatus for separating liquids from vapours or gaseous fluids (com.)—J. Scoffern and G. Tidcombe. Manufacture and treatment of paper and millboard.

On March 6th.—828 to 845.—E. A. Chameroy. Registering, controlling, and weighing machine.—F. E. B. Beaumont. Percussive rock drills.—W. Hilton and F. R. Clarke. Steam trap.—A. Moore. Apparatus for applying a liquid coating to flexible metallic fabrics or sheets.—T. Christy, jun. Process for accelerating tanning without employment of chemicals or other machinery than at present in use (com.)—S. Farnsworth. Valve apparatus for controlling the passage of water or other fluids.—J. A. Balshaw. Gloves and other hand-coverings.—J. Pilbrow. Construction of skate or apparatus adapted for use upon artificial ice or other smooth surface.—G. L. Brown. Piling cloths and soft goods, and the means employed therefor.—G. Livingstone. Carts for the collection and removal of slop, mud, or dust, and for the conveyance of other materials.—J. R. Humphries. Apparatus for preparing the joints of leaden and other soft metal pipes.—J. Cooke. Construction of rotary engines and pumps.—E. Shackleton and J. Peel. Looms for weaving.—A. Parkes. Furnaces for metallurgical operations, also applicable to steam boiler and other furnaces.—W. R. Lake. Manufacture of metal dies (com.)—W. R. Lake. Bed or couch for the transportation of infirm, sick, or wounded persons (com.)—S. Cotton. Machinery for preparing flax and other similar fibrous substances.—J. W. West. Spooling yarn, thread, silk, twine, &c.

On March 8th.—846 to 859.—H. J. Kennard. Stoves and flue pipes.—F. W. Stoker. Mechanical puddlers.—E. O. Taylor. Looms for weaving.—A. Cattlin. Roller skates.—J. Ross. Application of cements to building and other purposes.—J. C. Haddan. Small machine for mowing and reaping (com.)—L Gori. Fittings or apparatus for stoppering or closing bottles or vessels, whether for effervescing, gaseous, or fermented, or for other liquids.—J. P. Smith and H. Goodfellow. Manufacture of roofing, paving, and other tiles.—E. Clarke. Machinery for the manufacture of cranked shafts or axles.—J. Kitson. Means and appliances for indicating or detecting the removal or opening of cases, boxes, or other receptacles, chiefly intended for jewellery and other cases containing valuables.—T. B. F. Moscrop. Modes of signalling on railways.—J. Watson. Sewing machines.—J. Currall. Apartments and bedsteads to be used by persons suffering from infectious and other diseases.—H. Crichley, Stoves or fire-places for heating apartments. kitchen-ranges, and conservatories, and for other like purposes.

On March 9th.—860 to 877.—D. Harris. Billiard tables and their fittings.—W. Prosser. Construction of roadways, tramways, streets, and other paved surfaces.—W. Mann and S. Owens. Valves.—T. Brown. Shafting picks, axes, adzes, and tools of a similar character.—W. Bywater. Apparatus for affecting the drawing, spinning, and twisting of flax, wool, cotton, silk, and other fibrous substances.—W. Brookes. Fastenings for sleeve buttons, solitaires, and studs, which are also applicable to other ornamental articles of dress (com.)—E. A. Jeffreys. Construction of railway wheels.—A. Collingridge. Construction of pneumatic, hydraulic, steam, and other machinery employed for propelling, pumping, hauling, driving, or traction purposes.—E. Fennessy. Fire-arms and ordnance.—W. Bramham. Machinery for drying white lead and other similar substances.—P. Jensen. Knitting machine (com).—J. Swindells and G. A. Robinson. Construction of polling stations or polling booths as required by the Ballot Act.—P. Atherton. Looms for weaving. N. K. Cherrill. Wheel or roller skates.—J. H. Johnson. Mats or apparatus for receiving or moving dirt or deposit from the feet (com.)—J. Y. Smith. Railway brake apparatus, and signalling, registering, and other devices connected therewith.—A. V. Newton. Machinery for drawing and spinning hemp, flax, and other fibrous substances (com.)—W. D. Ruck. Means and apparatus for consuming smoke and economizing fuel.

On March 10th.—878 to 896.—G. E. Newton. Steam boilers.—R. Maynard. Portable chaff-cutting machinery.—W. W. Morton. Enabling a soldier, volunteer, or other person to use the snider or any other rifle, for the purpose of practising, aiming at a shorter range than could be obtained by using an ordinary cartridge.—W. Hulton, J. Hulton, and T. Crook. Machinery or apparatus for winding yarn or thread.—P. Jensen. Scales and weights for analytical purposes (com.)—W. A. Blake and G. Moss. Sewing machines, shuttles for the same, and bobbins for the same.—W. E. Garforth and W. Walker. Expansion gear for motive-power engines.—P. Kirk. Puddling and heating furnaces, and the fire-grates of such furnaces, and the method of supplying the same with fuel —S. Holland. Method of and apparatus for saturating cops or yarn, or for effecting the permeation of cops or yarn with liquid.—D. Elkan. Mode of securing the tips of umbrellas and parasols.—P. L. Deighton. Means of and process for metalling the covers of books and similar articles for decorating and illuminating purposes.—H. Gardner. Edge tips for the toes of boots and shoes (com.)—J. S. Wallace and E. Tucker. Protection of houses, ships, safes, and other structures and receptacles from fire.—J. Vivian and J. Blackburn. Hoists, and apparatus connected therewith.—F. B. Taylor. Steam-engine, also applicable for use as an air, water, or other fluid motor.—C. M. Spencer. Machines for screws. (Complete specification.)—W. E. Newton. System of and apparatus for extracting mercury and other volatile metals from their ores (com.)—R. Kilburn, J. E. Kilburn, and E. Greenwood. Couplings for railway carriages, trucks, or other such vehicles.—J. W. Watts. Combined ships' bunk or berth and life preserving apparatus.

On March 11th.—897 to 915.—F. C. Danvers and J. H. Landon. Manufacture of consolidated coal.—R. Paul and W. Sanderson. Glass furnaces.—W. L. Wise. Propelling apparatus (com.)—W. Ellis. Machines for boring rocks and other hard substances.—E. Fisher and T. Marshall. Carts and wheeled vehicles.—R. Carey and R. Porter. Valves for regulating the flow or discharge of gas, water, and other fluids.—F. H. McLeod. Composition to be applied to sheep and other animals for destroying vermin thereon, and for protecting them therefrom.—P. Jensen. Bake ovens (com.)—H. Gibson and M. Towell. Stocks and dies.—H. Deacon. Manufacture of chlorine.—J. L. Clark and E. J. Hill. Mounting ships' davits and apparatus to facilitate stowing and lowering boats.—J. Higginbottom and E. Hutchinson. Method and arrangement of apparatus for scouring or cleaning wheat, rice, or other grain, whereby the weight or pressure of the grain is fully utilised.—W. H. Harfield. Capstans and windlasses.—W. H. Harfield. Hoisting and lowering machines.—W. H. Harfield. Capstans, cable holders, and cable stoppers.—J. H. Johnson. Machinery for grinding or sharpening, and apparatus connected therewith, parts of which are applicable to other similar purposes (com.)—C. Cogswell. Wind screen to be adapted to open carriages, and to landaus and other carriages capable of being used open or closed.—M. Anquez. Construction and manufacture of spring hats, known as "Gibus hats."—W. Burgess. Road sweeping and scraping machines.

On March 12th.—916 to 933.—W. Knott and T. Rudd. Apparatus for ventilating mines.—T. Humpage. Manufacturing and ornamenting coffin plates.—C. J. Little. Steam-engine expansion valves.—H. Bateman. Corkscrews.—A. Smith. Apparatus for opening aërated water bottles, and for drawing off the contents from such bottles without waste or splashing.—E. P. Alexander. Fire-arms (com.)—W. E. Gedge. Skates (com.)—J. B. Robertson. Knitting machines.—E. T. Hughes.—Apparatus for propelling or shunting railway rolling stock, applicable also to other vehicles (com.)—J. King. Manufacture of railway wheels.—N. Dobson. Weaving fabrics in imitation of seal and other skins and furs.—A. M. Clark. Utilizing tin plate scraps or clippings (com.)—A. M. Clark. Manufacture of artificial lace (com.)—P. Austin and J. Austin. Milling or fulling machines for woollen and other woven or felted fabrics.—J. Findlay and W. Jack. Destructive distillation of coal, shale, and other bituminous substances, and the apparatus or retorts employed therefor.—C. Mace and J. Dickinson. Construction of steam boilers, and setting the same.—J. Dickinson and C. Mace. Marine and other steam boilers, and setting the same.—R. Milburn and H. Jackson. Apparatus for breaking, crushing, and disintegrating ores, rock, stone, chalk, clay, cement, clinkers, lime, bones, and other materials of a britttle or cloggy nature, and for mincing, masticating, or disintegrating fish, flesh, offal, bones, and certain manures, and for mixing concrete, and for preparing the materials for cement making, and for some other purposes.

On March 13th.—934 to 949.—W. Liddiard. Earth closets.—J. Richards, D. Williams, T. W. Matthews, and T. P. Leather. Apparatus employed in the manufacture of tin plate.—S. T. Dutton. Signalling on railways, including appliances used therefor.—W. Morgan-Brown. Photographic apparatus (com.)—H. W. Cook. Apparatus for pumping or exhausting liquids or gases and forcing fluids.—M. Rowand. Poles for wheel carriages.—E. Priest, A. Priest, and J. Law. Condenser doffers of carding engines.—B. Rhodes, T. B. Rhodes, and J. R. Stoney. Machinery or apparatus employed for pulverizing or reducing flocks, mungo, rags, waste, or other fibrous substances.—R. Rankin. Machinery for the manufacture of tobacco or smoking pipes.—J. Tomey. Water gauge glasses.—S. Madden. System of folding brackets to be used as articles of utility and convenience in cabin, camp, office, hall, or dressing room.—A. C. Bagot. Pressure or temperature indicator and alarm apparatus to be employed in connection with the interior of ships, subterranean passages, compartments, or capacities.—J. W. Banford. Receptacles for holding pipes, tobacco, cigars, matches, and other articles.—H. Warner. Fastenings for metallic and other books.—H. B. Binko. Label dampers, applicable to inkstands, spray producers, ear and other brushes.—W. R. Lake.

Flour dressing machine (com.) (Complete specification.)

On March 15th.—950 to 959.—J. Cooke. Construction of rotary engines and pumps.—H. P. Holt. Construction of buildings and appliances appertaining thereto.—A. F. Spiller. Roller skates.—H. B. Roberts. Permanent way of railways.—A. Hooper. Chimney pots or tops. J. L. Rawbone. Creasers for creasing cartridges (com.)—E. A. Jones and J. A. Jones. Rotary puddling furnaces, and apparatus or means employed in connection therewith.—J. Alison. Steam-boilers.—W. Bowker. Arrangements and combinations of apparatus for giving intermittent revolving motions to the taking-up and letting-off motions of looms, and for giving self-acting feed motion to all descriptions of tools and machines worked by hand or power.—F. Wirth. Compounds for plastic and other purposes (com.)

On March 16th.—960 to 978.—J. Owen. Life-preserver, a certain apparatus to be used for preventing collisions and similar accidents on railways, tramways, and the ships of the sea, such as are propelled by mechanical power.—J. Edwards. Apparatus for drawing liquids from vessels.—M. Watson and J. Anderson. Self-locking box or apparatus for receiving and securing cash, papers, or other articles.—R. H. Rogers. Improving, simplifying, and lessening the cost of the actions of cottage and oblique pianofortes.—W. Morgan-Brown. Water or cascade air-pumps (com.)—W. Morgan-Brown. Apparatus for the evaporation or concentration of fluids at high or low temperatures with or without the application of a current of air or steam (com.)—W. Morgan-Brown. Production of white photographic plates or white surfaces to be used in photographic printing (com.)—G. Porter, jun. Fire guards and method of affixing the same.—A. Smith. Appliances for closing aërated liquid bottles.—C. Catlow. Buffers of railway carriages.—P. Jensen. Construction of electric light apparatus (com.)—J. Fullerton. Method of securing lids to packing and other boxes, and the means employed therefor.—J. F. Kain. Umbrellas, parasols, walking-sticks, riding-whips, and other similar articles.—J. H. Johnson. Treatment of sugar-cane, and the machinery or apparatus employed therein (com.)—J. H. Johnson. Apparatus for transmitting musical vibrations or signals by means of electricity (com.) (Complete specification.)—W. R. Lake. Umbrellas (com.)—W. R. Lake. Injectors for steam generators (com.)—G. D. Mease. Manufacture of sulphate of soda or potash and bleaching powder, and apparatus employed therein.—H. Bland. Apparatus or means for ensuring the more efficient, economical, and safer working of railways.

On March 17th.—979 to 990.—H. J. Altman. Breech-loading fire-arms.—W. H. Berry and C. H. Booth. Railway carriage and other wheels.—W. N. Crine and H. Shelley. Umbrella tip fastener.—S. Hunt. Method of and apparatus for coupling, connecting, and regulating the laxity of railway trains, part of which apparatus also acts as a brake.—A. Reith. Speaking tubes.—W. Phillips. Waterclosets. F. M. Marsden. Button fasteners, and apparatus for attaching the same.—T. Coleman. Rollers for horses.—J. J. Heurtier. Machinery for capsuling bottles containing champagne or other effervescing liquids.—S. S. Lewis and A. Copie. Manufacture of soap.—J. Keats. Manufacture of buttons.—B. T. Moore. Determining the direction or magnetic bearing of deep sea or other currents.

On March 18th.—991 to 1011.—J. Lee. Manufacture of steel and other metallic instruments.—J. Whittaker. Machinery for manufacturing or forging blank nuts, bolts, spikes, rivets, and similar articles.—R. Low. Turning lathes.—W. C. Hood. Apparatus for regulating the flow of liquids.—W. N. Haggard. Electro-magnetic signalling apparatus.—J. Allmann. Steam traps.—J. Reimann. Sewing machines for edge sewing and button-holes.—C. D. Abel. Apparatus for supporting respiration and light in suffocating atmospheres and under water (com.)—P. Brotherhood. Apparatus for forcing or compressing fluids or liquids.—W. Batty. Invalid urinals.—J. T. King. Printing machine (com.)—J. H. Johnson. Permanent way of railways and tramways (com.)—E. P. H. Vaughan. Mode of applying oil painting to wood, plaster, and other surfaces, and the materials connected therewith (com.)—E. P. H. Vaughan. Feeding bottle (com.)—W. Inns. Forming the hearth of puddling furnaces.—A. M. Clark. Weft stop motion for looms (com.)—A. M. Clark. Motor (com.)—G. Haseltine. Machinery for the manufacture of paper-boxes (com.) (Complete specification.)—G. Haseltine. Wood-planing machines (com.) (Complete specification.)—S. Simmons. Apparatus for cleaning carpets.—E. S. Burchett. Boxes for containing matches and other articles.

On March 19th.—1012 to 1028.—G. B. Dixwell. Steam-engines and the working thereof, and thermometric apparatus therefor. (Complete specification.)—W. J. Curtis. Apparatus for increasing the security of railway points or switches.—C. E. Lomel. Breech-loading fire-arms.—R. Saunders. Floating breakwaters.—J. P. O'Brien. Machinery or apparatus for capsuling bottles and other like receptacles.—E. P. Alexander. Internal arrangements and fittings of the compartments of railway carriages and of ships' cabins (com.)—M. Draper. Boots and shoes.—J. Mitchell and T. Mitchell. Machine for stretching calico or other woven fabrics.—J. Somerset and I. R. Hayes. Apparatus to be employed for lubricating revolving shafts or axles.—J. Somerset and I. R. Hayes. Construction of railway chairs and fastenings.—E. Boire. Steam-engines.—J. H. Johnson. Rolling stock of railways and tramways (com.)—J. Howard and E. T. Bousfield. Steam cultivating machinery. H. E. Newton. Bearing and wearing surfaces for spindles, axles, and shafting, and the preparation of such surfaces (com.)—R. P. B. Taaffe. Roller skates (com.)—W. Radeke. Manufacture of artificial fuel and apparatus to be employed therein.—A. Browne. Construction of steam cranes (com.)

On March 20th.—1029 to 1039.—G. Burney. Tank filters, partly applicable for attachment of cement to other metal surfaces.—T. Skinner. Etching on glass.—T. Holliday. Manufacture of colouring matter suitable for dyeing and printing.—C. Wood. Trucks or waggons for conveying minerals.—W. R. Lake. Apparatus for connecting and securing scaffold poles (com.)—D. D. Ritchie. Apparatus for holding, cutting, and gilding, or otherwise ornamenting books, paper, or cards.—W. S. J. Gerrard and J. Eckersley. Method of and apparatus for sizing and dressing yarns.—W. Foulis. Machinery for cutting coal and other minerals.—L. Binns. Manufacture of bands, cords, or ropes, and machinery or apparatus to be employed therein.—F. Versmann. Manufacture of colouring matters.—J. S. Dronsfield. Apparatus for grinding the cards and card rollers employed in carding engines, partly applicable in the construction of apparatus for exhausting and forcing air or other fluids.

On March 22nd.—1040 to 1052.—G. Hill. Gas meters.—J. Waugh. Apparatus for charging bottles or other vessels with gaseous or effervescing liquids, and closing and opening bottles containing such liquids, and means employed therefor.—A. M. Clark. Screw propeller (com.)—W. Tasker. "Bobbin-winder" or apparatus for winding bobbins, reels, or spools for sewing machines and other purposes (com.)—A. Cattlin. Roller skates.—T. W. Beverley. Slide, surfacing, and screw-cutting lathes.—E. Charageat. Umbrellas, parasols, and other similar articles—J. Bussey. Machinery for assorting corks.—J. Steiger. Production of embroidery by machinery. (com.)—W. R. Lake. Apparatus for preventing the explosion of steam-boilers (com.)—W. R. Lake. Machine for sewing and seaming hosiery (com.)—W. Harrison. Spindles and adjustable appliances for fixing door handles thereto, also escutcheons for doors.—F. W. Dähne. Converting glassy slag resulting from metallurgical operations for the utilization thereof.

On March 23rd.—1053 to 1065.—H. Rawlings. Construction of filters for the purification of water and other liquids.—J. J. Bodmer and L. R. Bodmer. Treatment of slag or scoria, and of iron.—S. S. Hall and J. Hobson. Looms for weaving.—H. Harrison. Fastenings for rail ends.—B. Wade. Construction of covers for tobacco pipes.—W. T. Walker. Centre valves.—J. E. C. Koch. Imitation or false neckties.—J. H. Butler. Handle for chests, trunks, drawers, and similar articles.—J. Kitchen. Washing and churning machine.—B. Birnbaum. Pouch or receptacle for tobacco.—J. Swan. Gas burners known as the "Ellis gas burners" (com.)—C. Malpas. Kilns or ovens for firing pottery, bricks, tiles, and other ceramic ware, and for burning limestone.—R. Brown. Candlesticks.

On March 24th.—1066 to 1085.—W. Knowelden. Machine for "pulling" or removing the hair from cony or other skins of animals.—B. Cox and C. Hosmer. Needle and fastener for securing buttons for upholstery purposes (com.)—B. Harlow. Boilers for hot-water heating apparatus and the method of fixing the same.—H. Coupe and E. Wilson. Apparatus for opening and closing folding doors.—W. H. Hunstone and J. Thorpe. Manufacture of artificial leather cloth and similar fabrics, and machinery or arrangements to be used for the purpose.—W. Travis. Self-acting mules for spinning wool.—E. Jackson. Cartridge for breech-loading guns.—F. N. Mackay and D. Rae. Freezing and refrigerating and apparatus employed therein.—G. W. Bacon. Mangles and clothes-wringers.—C. Bondi. Signalling on railways.—J. Thornton. Machinery or apparatus for dressing flour.—J. Challander. Apparatus for illuminating public clocks, also applicable to other illuminating purposes.—A. H. Cramp. Stocking supporter.—A. Ward. Sash fastener.—S. Wheeler and E. Jerome. Manufacture of and apparatus for forming boxes and other hollow articles from pulp.—G. Hunter. Steam boilers.—T. J. Smith. Spinning machinery for the purpose of preventing breaks and defects in the thread (com.)—J. N. Lessware. Manufacture of glucose sugar, and obtaining infusions and extracts for brewing and other purposes.—A. Kusenberg. Automatic waste-water-conduit.—O. J. Wilmart. Process of uniting or welding together wrought iron and steel. (Complete specification.)

On March 25th.—1086 to 1108.—G. Haseltine. Rotary steam-engines (com.)—J. Noad. Fire lighters and apparatus to be employed in the manufacture thereof, which apparatus is also applicable for the cutting of ordinary fire-wood.—A. Browne. Method and apparatus for purging cylinders of steam-engines (com.)—G. Matthews. Machinery for rolling hoop and other iron and steel.—L. Sterne. Railway couplings.—C. Willis. Method of and apparatus for feeding steam-boilers.—T. F. Reed. Apparatus for forcing screw propellers off their shafts, and for other similar purposes.—S. Hill. "Back-sight" for military rifles.—J. B. C. H. Petitdidier.—Process of dyeing silk, woollen, or other fabrics.—S. Hatchard and F. Talbot. Hearses and biers.—A. Crichton and J. Craig. Apparatus for the prevention of railway accidents arising from inattention and non-observation of signals.—D. Copland. Combs for the head (com.)—W. Stableford. Railway wheels. (Complete specification.)—E. Walker. Apparatus for feeding water to or within boilers, such apparatus also facilitating the collection and the discharge of sediment therefrom (com.)—R. Fawcett and J. E. Firth. Slide valves of steam engines and steam hammers.—Hon. R. Flower. Apparatus worked by compressed air or other fluid and applied to the shearing or cutting of the wool or hair of animals; part of which is also applicable to direct-acting pumping machinery, and to rock-drills.—H. Gardner. Sewing machines (com.)—W. V. V. Lidgewood. Coffee pulping machines.—R. George. Flower pots, troughs, and plant holders, and the means of supplying fluids or moisture to trees, plants, cuttings, growing crops, and seeds.—D. Hoult and G. Hoult. Railway break apparatus.—E. Edwards. Tubs or packages for holding butter (com.)—J. Sykes, J. E. Sykes, and E. W. Sykes. Tubes used for spinning worsted or other fibrous substances.—A. M. Clark. Machinery for cutting and sawing timber (com.)

SEYYID BURGHASH, the Sovereign of Zanzibar, was present on the evening of the 28th ult. at a meeting of the Royal Geographical Society, and, in reply to a complimentary address by the President, Sir Henry Rawlinson, made a speech, translated by Dr. Badger, in which he spoke in high praise of African travellers, and promised to promote the cause of geographical research At the same meeting Dr. W. B. Carpenter read a paper on "Recent Observations of the Challenger and Tuscarora, and the bearings on the Temperature Theory of Oceanic Circulation."

THE INVENTORS' INSTITUTE,

ESTABLISHED 1st MAY, 1862.

FORTNIGHTLY MEETINGS, DURING SESSION,
HELD AT
4, ST. MARTIN'S PLACE, TRAFALGAR SQUARE.

PAST PRESIDENT—SIR DAVID BREWSTER, K.H., LL.D., F.R.S., &c., from the Establishment of the INVENTORS' INSTITUTE till his decease, February, 1868.

PAST PRESIDENT—LORD RICHARD GROSVENOR, M.P., &c., from February, 1868, till May 1871

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